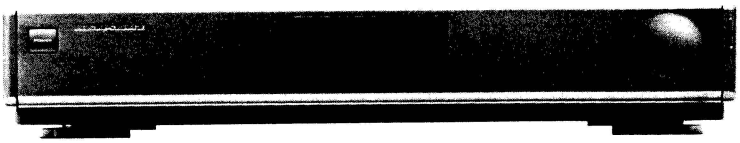
Service Manual

75 SD2020/2A/2B
SD2020F, U, K
Cassette deck



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Please use this service manual with referring to the user guide (D.F.U.) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行ってください。

marantz®

model SD2020

4822 725 51169
First issue : 1998.01
477T855010 AO

PCS 98 174

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, **MARANTZ** company has created the ultimate in stereo sound. Only original **MARANTZ** parts can insure that your **MARANTZ** product will continue to perform to the specifications for which it is famous.

Parts for your **MARANTZ** equipment are generally available to our National Marantz Subsidiary or Agent.

ORDERING PARTS :

Parts can be ordered either by mail or by Fax.. In both cases, the correct part number has to be specified.

The following infomation must be supplied to eliminate delays in processing your order :

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature : any order form or Fax. must be signed, otherwise such part order will be considered as null and void.

USA

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FAX : 630 - 307 - 2687

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746 - 750 WANGBURAPA BANGKOK
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29, LENG KEE ROAD
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PHONE : +65 475 - 4555
FAX : +65 475 - 8623

SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard NO. 1492.

In case os difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. TECHNICAL SPECIFICATIONS (DIN)

Motor (s) and type ..... 1 DC
Number of heads 2

Frequency range (3 dB limits ~ no Dolby)
Type IV (metal) tape ..... 30 Hz ~ 19 kHz
Type II (High) tape ..... 30 Hz ~ 18 kHz
Type I (Fe / Normal) tape ..... 30 Hz ~ 17 kHz
Signal to noise ratio (High tape at 1 kHz) (no Dolby NR / Dolby B and C NR) ..... 58 / 67 / 72 dB
Wow and flutter ..... 0.1 %
Output level / impedance ..... 600 mV / 1.5 kohm

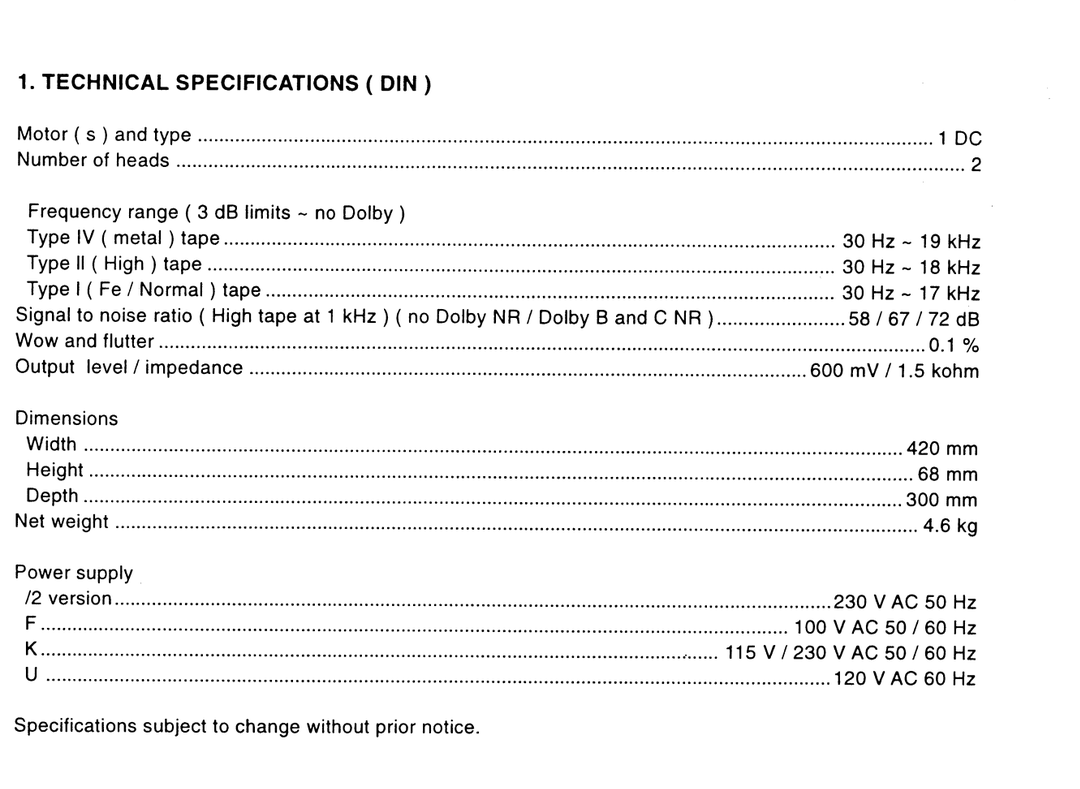
Dimensions
Width ..... 420 mm
Height ..... 68 mm
Depth ..... 300 mm
Net weight ..... 4.6 kg

Power supply
/2 version ..... 230 V AC 50 Hz
F ..... 100 V AC 50 / 60 Hz
K ..... 115 V / 230 V AC 50 / 60 Hz
U ..... 120 V AC 60 Hz

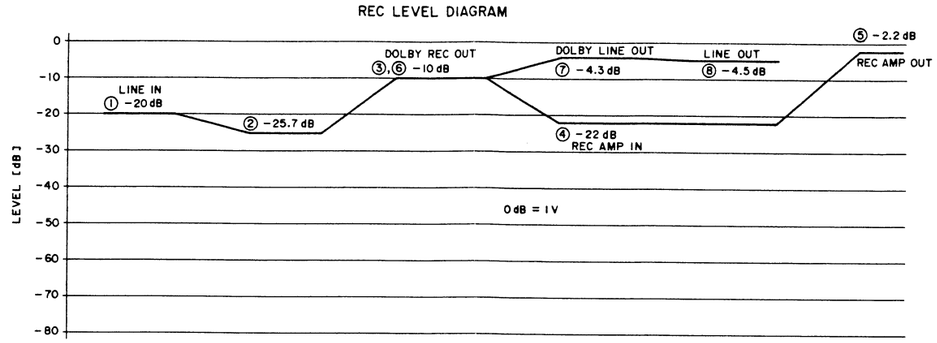
Specifications subject to change without prior notice.

2. BLOCK DIAGRAM AND LEVEL DIAGRAM

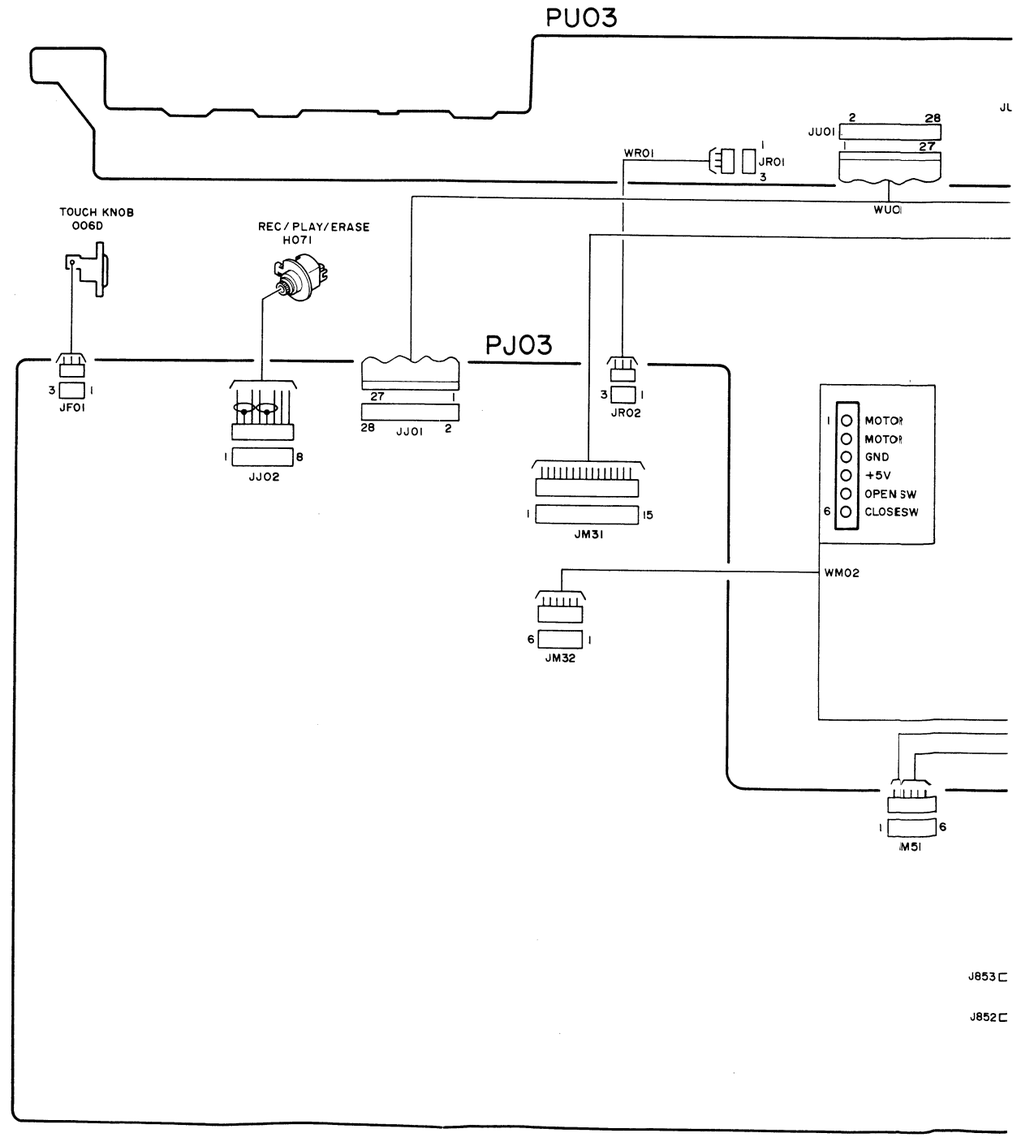
2.1 BLOCK DIAGRAM



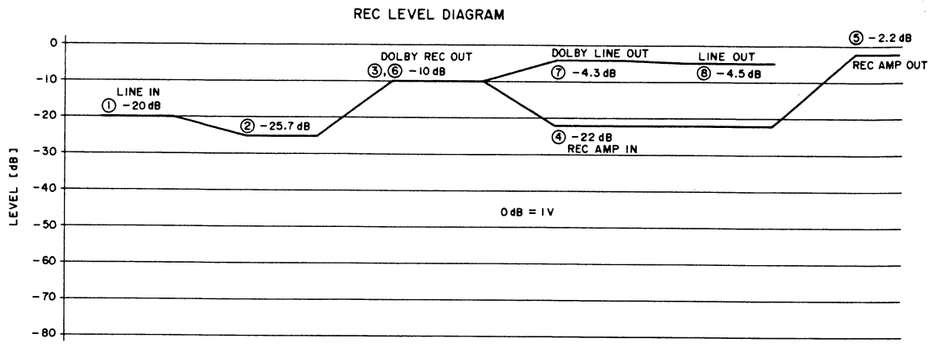
2.2 LEVEL DIAGRAM

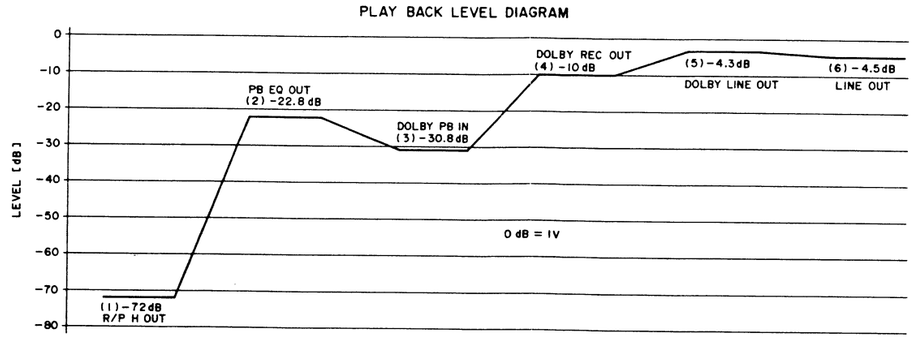


3. CONNECTION DIAGRAM

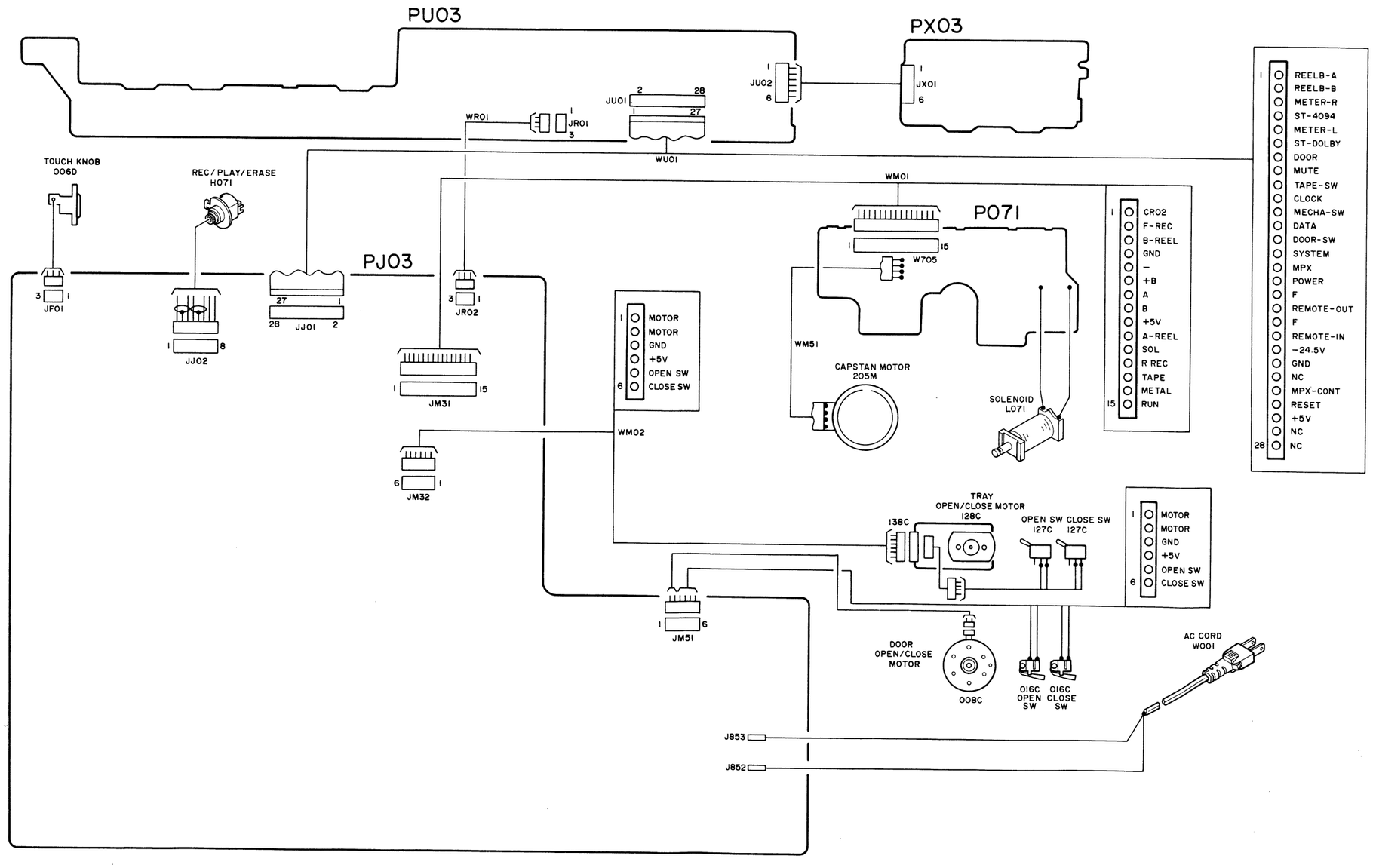


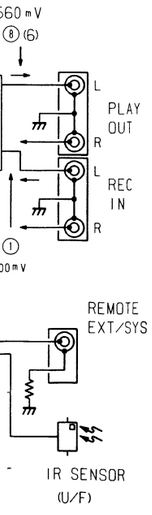
2.2 LEVEL DIAGRAM



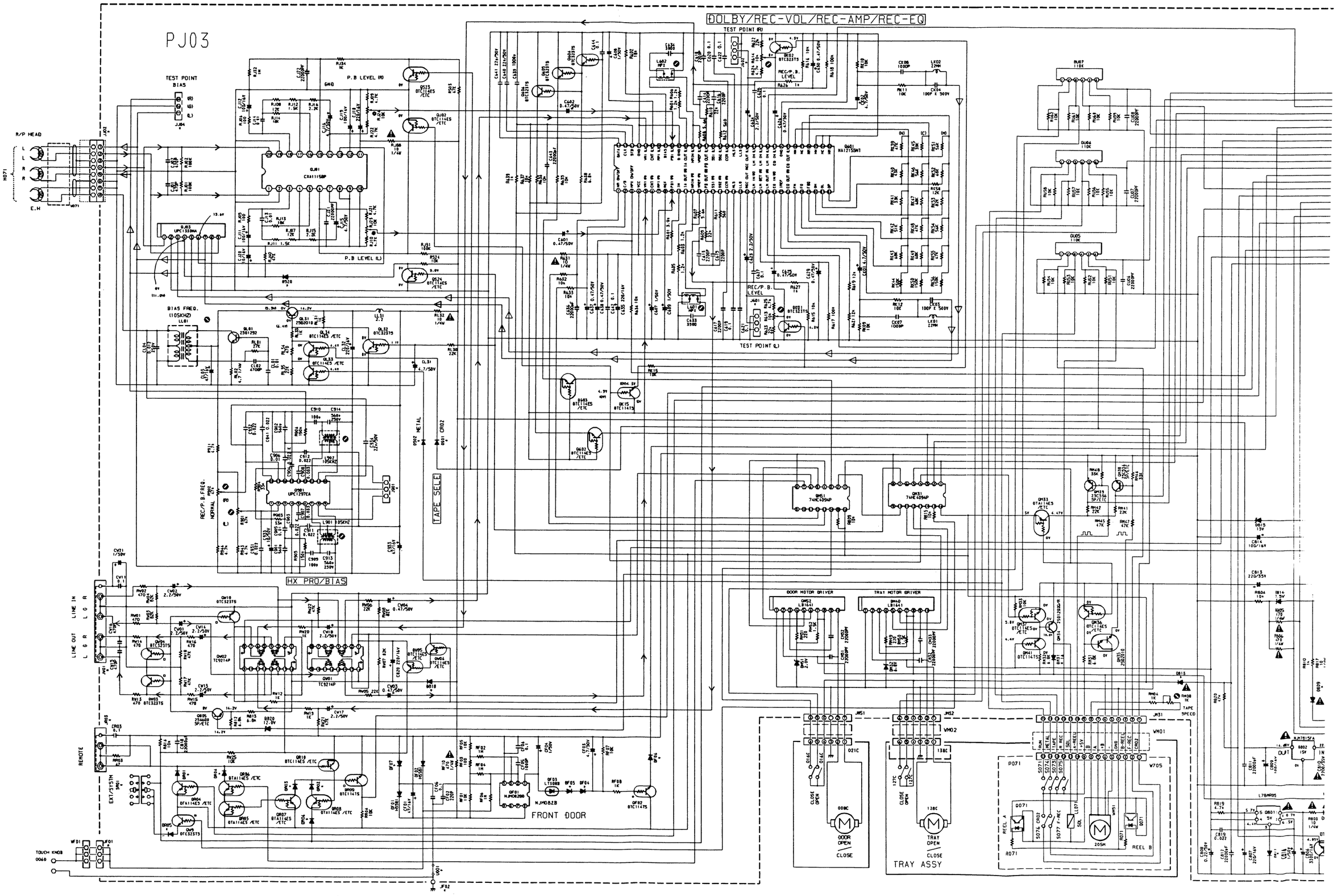


3. CONNECTION DIAGRAM





4. SCHEMATIC DIAGRAM AND PARTS LOCATION (Pattern side)



DOLBY/REC-VOL/REC-AMP/REC-EQ

TEST POINT (R)

TEST POINT (L)

REC/P.B. LEVEL

REC/P.B. LEVEL

GA01 NA7215SNT

WU01

REEL B-A
REEL B-B
METER-R
ST-4094
METER-L
ST-DOLBY
DOOR
MUTE
TAPE-SW
CLOCK
MECHA-SW
DATA
DOOR-SW
SYSTEM
MPX
POWER
F
REMOTE-OUT
F
REMOTE-IN
-24.5V
GND
MPX-CONT
RESET
+5V

PU03

GU01 M88862ABP-G-146-5K (BOTTOM VIEW)

GU08 100KX13

100KX9

FL

DOLBY

REVERSE MODE

OFF-B-C

TIMER

PLAY-OFF-REC

PX03

PAUSE REW STOP PLAY F.F. REC P.PLAY

REC MUTED

DOOR MOTOR DRIVER

TRAY MOTOR DRIVER

DOOR OPEN CLOSE

TRAY OPEN CLOSE

TRAY ASSY

TAPE SPEED

REEL A

REEL B

TRANS

PLAY BACK SIGNAL

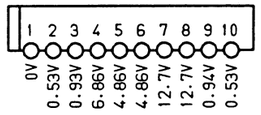
RECORDING SIGNAL

U 120V /2B /2A 230V F 100V

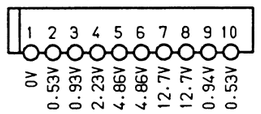
K ONLY

115V 230V

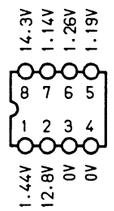
(QM40) LB1641



(QM52) LB1641



(QF01) NJM082BD



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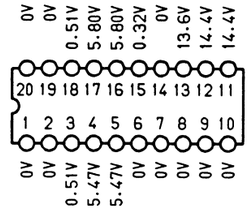
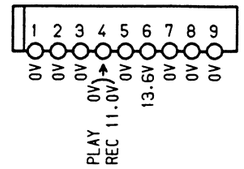


(QJ03) UPC1330HA



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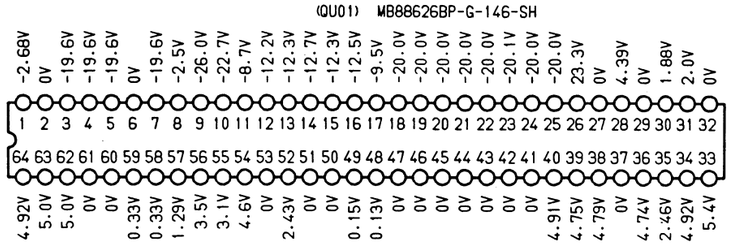
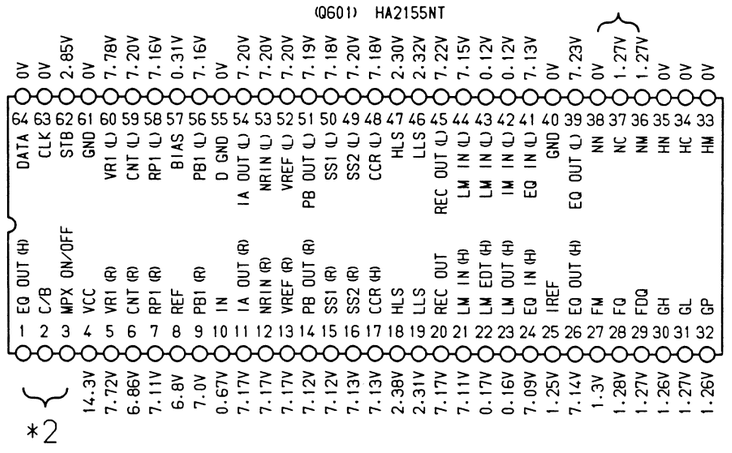


(QQ01) HA2155NT

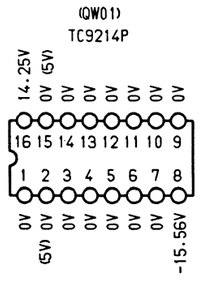

0V 0V 2.85V 0V 7.78V 7.20V 7.16V 0.31V 7.16V 0V 7.20V 7.20V 7.20V 7.19V 7.18V 7.20V 7.18V 2.30V 2.32V 7.22V 7.15V 0.12V 0.12V 7.13V 0V 7.23V 0V 1.27V 1.27V 0V 0V 0V
64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
DATA CLK STB GND VR1 (L) CNT (L) RP1 (L) BIAS PB1 (L) D GND IA OUT (L) NRIN (L) VREF (L) PB OUT (L) SS1 (L) SS2 (L) CCR (L) HLS LLS REC OUT (L) LM IN (L) LM IN (L) IM IN (L) EQ IN (L) GND EQ OUT (L) NN NC NM HN HC HM
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
EQ OUT (H) C/B MPX ON/OFF VCC VR1 (R) CNT (R) RP1 (R) REF PB1 (R) IN IA OUT (R) NRIN (R) VREF (R) PB OUT (R) SS1 (R) SS2 (R) CCR (H) HLS LLS REC OUT LM IN (H) LM EDT (H) LM OUT (H) EQ IN (H) IREF EQ OUT (H) FM FQ FDQ GH GL GP
14.3V 7.72V 6.86V 7.11V 6.8V 7.0V 0.67V 7.17V 7.17V 7.17V 7.12V 7.12V 7.13V 7.13V 2.38V 2.31V 7.17V 7.11V 0.17V 0.16V 7.09V 1.25V 7.14V 1.3V 1.28V 1.27V 1.26V 1.27V 1.26V
*2
*1
1.27V 1.27V

*1 TAPE SELECTOR

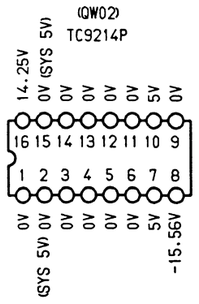
	㊳	㊴	㊵
N	0V	1.27V	1.27V
C	1.27V	0V	1.27V
M	1.27V	1.27V	0V

N : NORMAL
C : CrO2
M : METAL

(QW01) TC9214P



(QW02) TC9214P



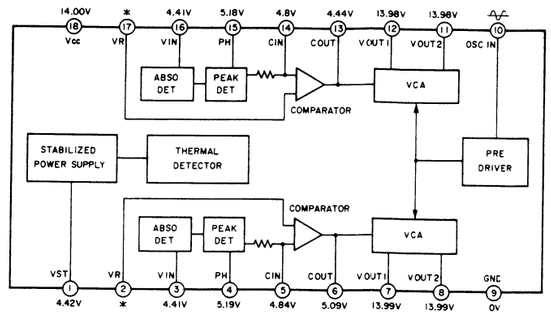
*2 DOLBY NR / MPX

	①	②	③
NR OFF	0V	4.9V	4.9V
NR B	4.9V	0V	0V
NR C	4.9V	4.9V	0V

VOLTAGE : MEASURED AT PLAY POSITION
( ) : REC POSITION

NOTE ON SAFETY :
Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol ⚠ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

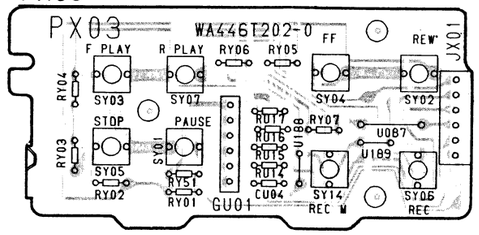
Q901 : μPC1297CA


14.00V * 4.41V 5.18V 4.8V 4.44V 13.98V 13.98V
18 17 16 15 14 13 12 11 10
Vcc VR VIN PH CIN COUT VOUT1 VOUT2 OSC IN
ABSO DET
PEAK DET
COMPARATOR
VCA
STABILIZED POWER SUPPLY
THERMAL DETECTOR
PRE DRIVER
VST VR VIN PH CIN COUT VOUT1 VOUT2 GND
1 2 3 4 5 6 7 8 9
4.42V * 4.41V 5.19V 4.84V 5.09V 13.99V 13.99V 0V

TAPE

	NORMAL	CrO2	METAL
*2	2.44V	2.96V	4.87V
*17	2.42V	2.93V	4.82V

PX03



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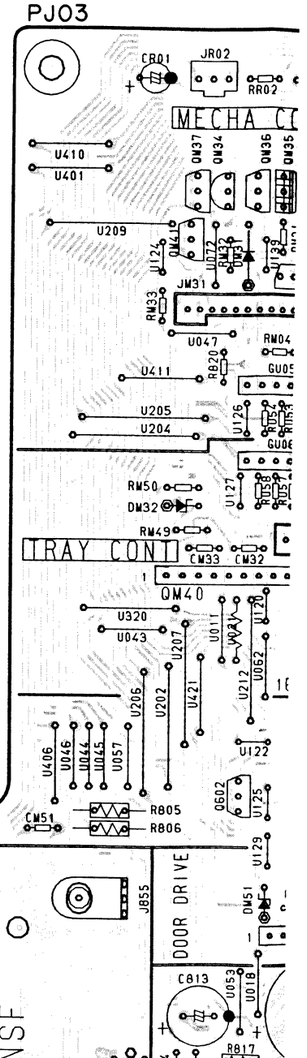
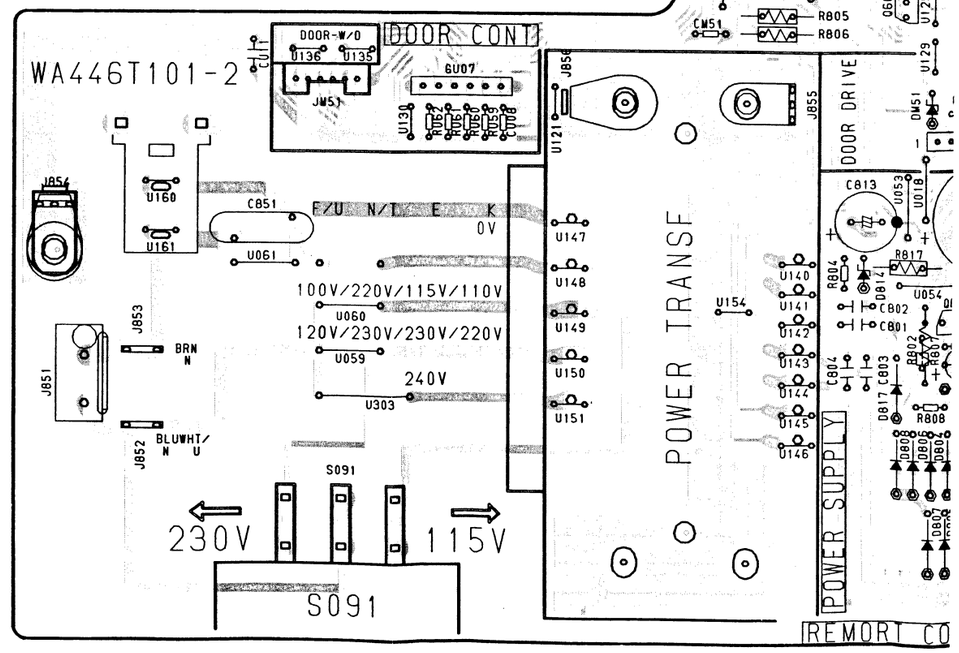
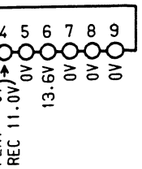




UPC1330HA



ELECTOR

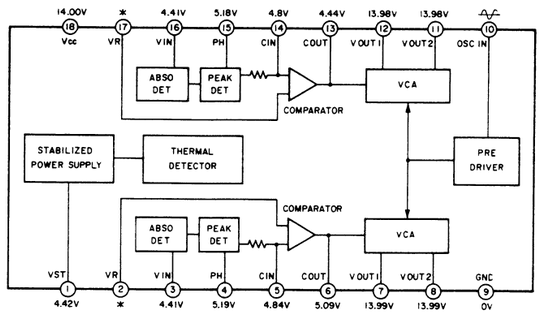
㊴	㊽
1.27V	1.27V
0V	1.27V
1.27V	0V

MAL

AL

T PLAY POSITION
ON

Q901 : μPC1297CA

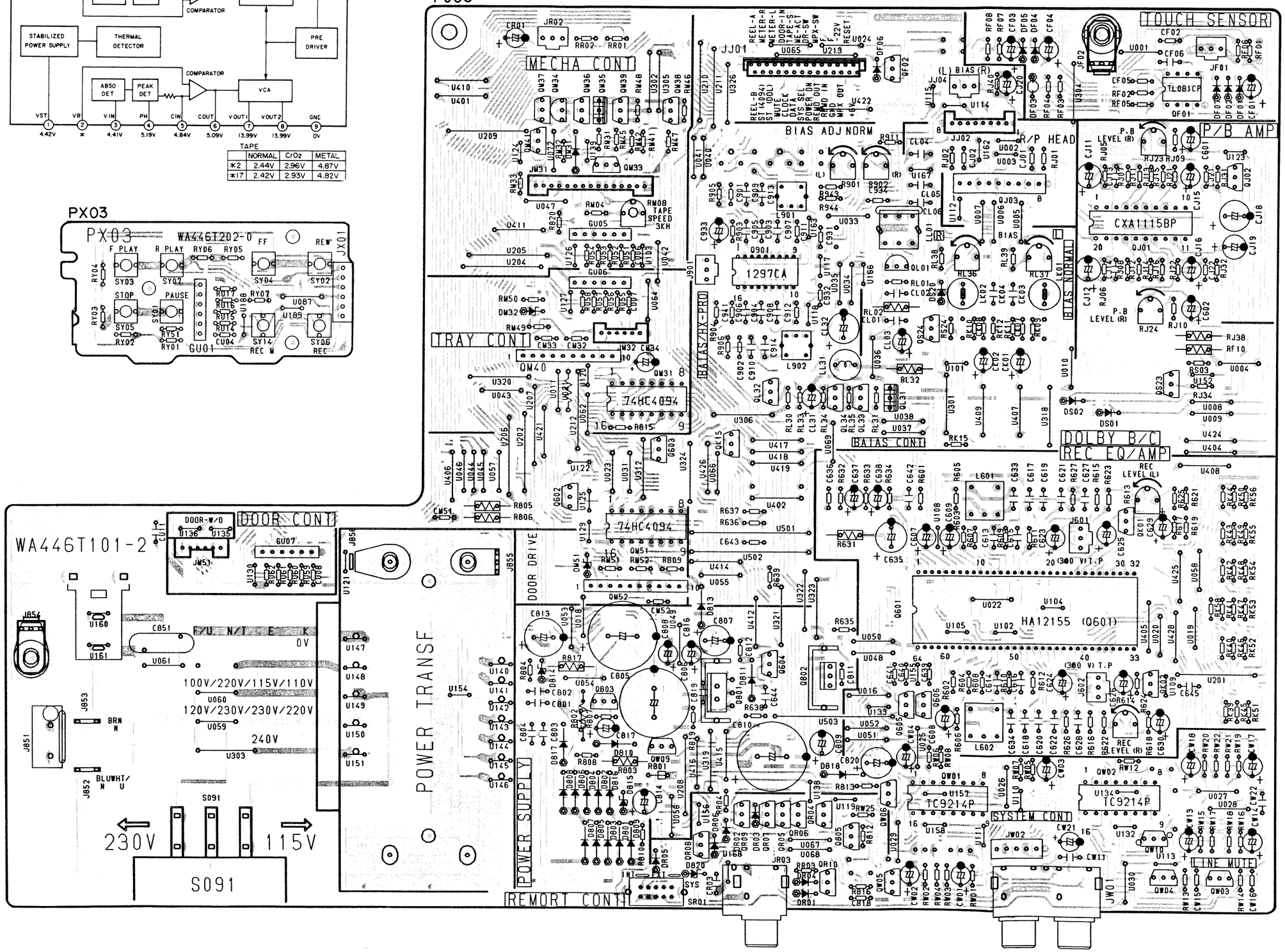


TAPE	NORMAL	CrO2	METAL
*2	2.44V	2.96V	4.87V
*17	2.42V	2.93V	4.82V

PX03

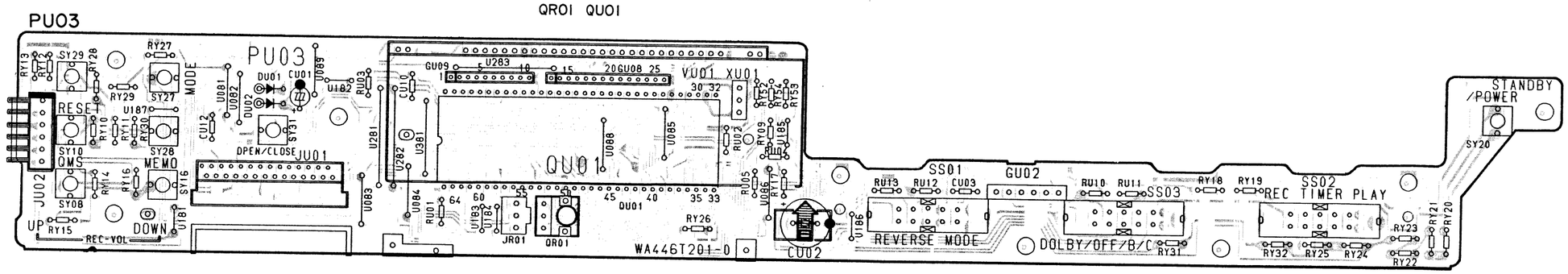
QM41 QM33～QM39 Q901 QL01 QF02 QJ03 QJ01 QF01 QJ02
QM40 Q602 QM52 QM51 QM31 Q603 QK15 QL32～QL34 QL31 QS24 QS23
Q803 QW09 Q801 Q604 Q802 Q605 Q606 Q601 QK01 QK02
QR04～QR10 Q805 QW05 QW06 QW01 QW02 QW10 QW04 QW03

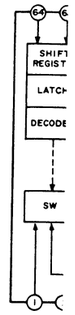
PJ03



PU03

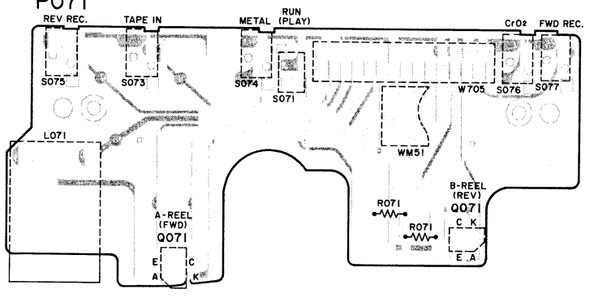
QR01 QU01



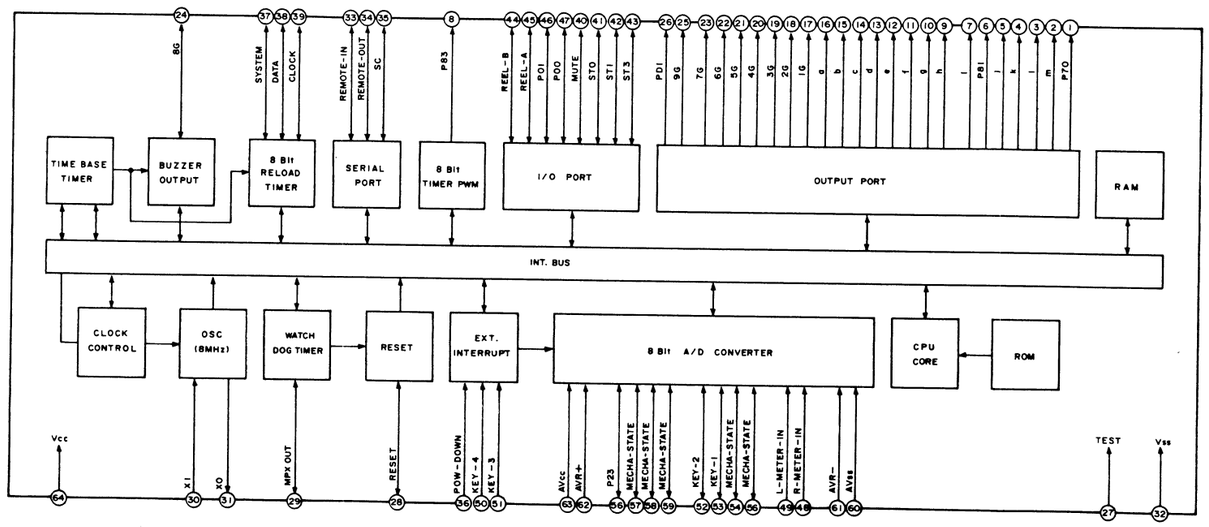


P071

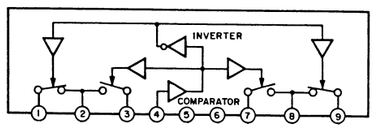
Q071 Q071



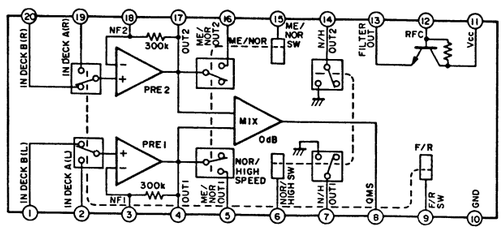
QU01 : MB88626BP-G-146-SH



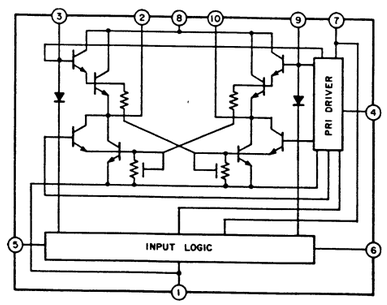
QJ03 : uPC1330HA

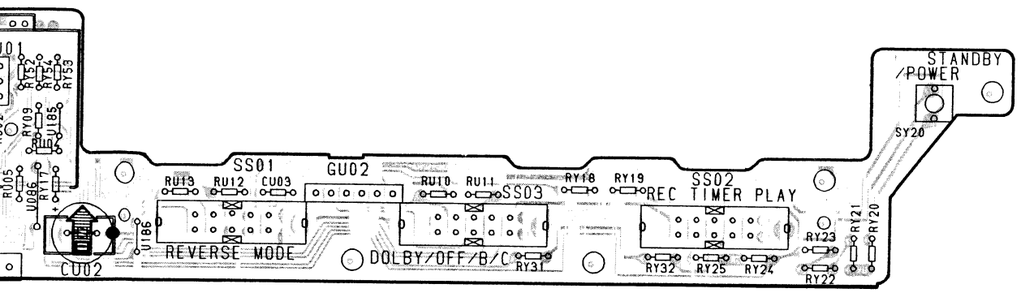


QJ01 : CXA1115BP

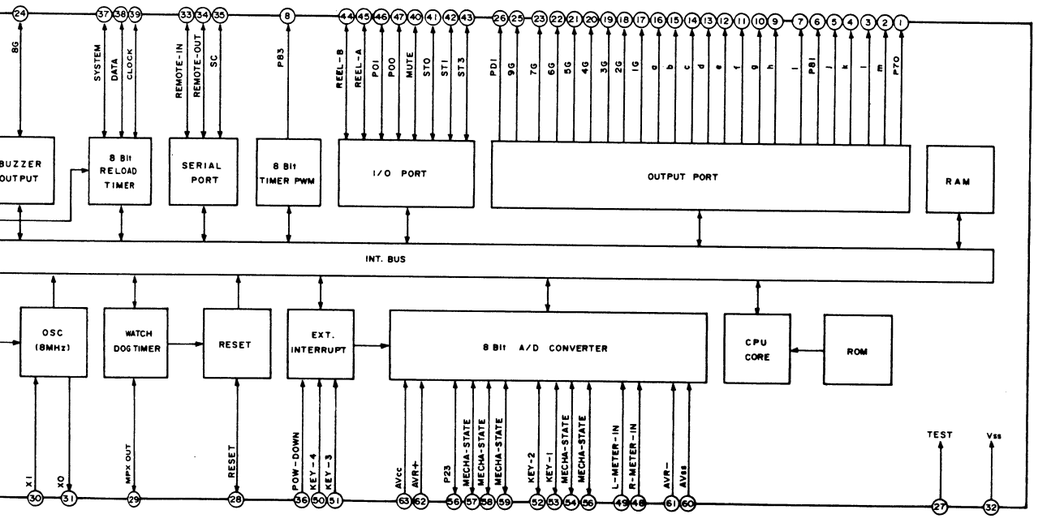


QM40, QM52 : LB1641

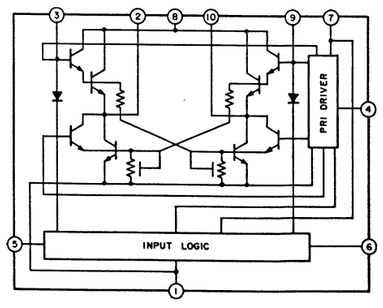




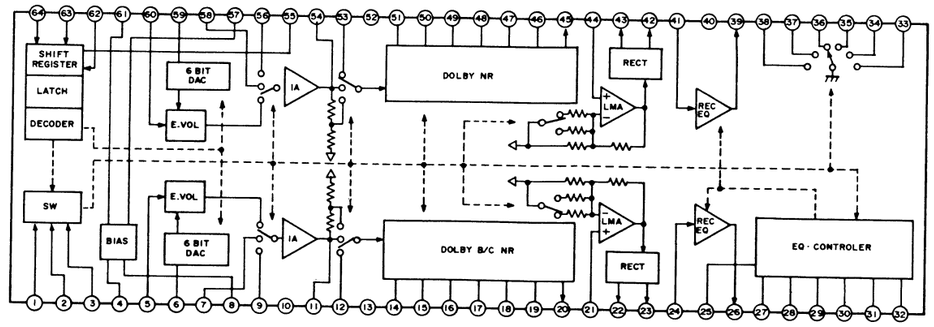
QU01 : MB88626BP-G-146-SH



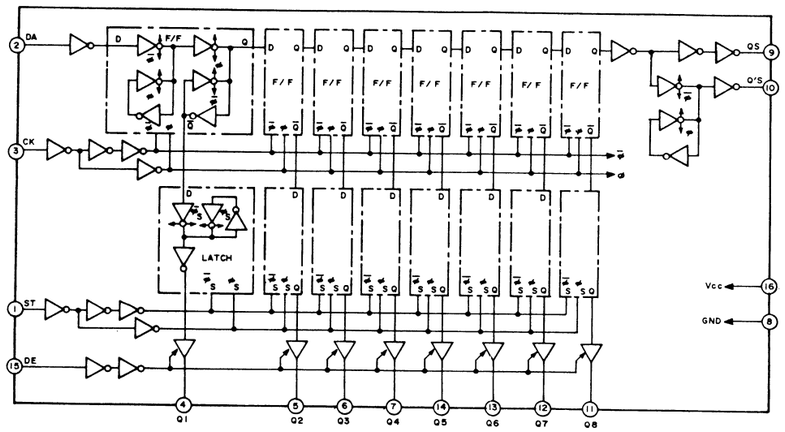
QM40, QM52 : LB1641



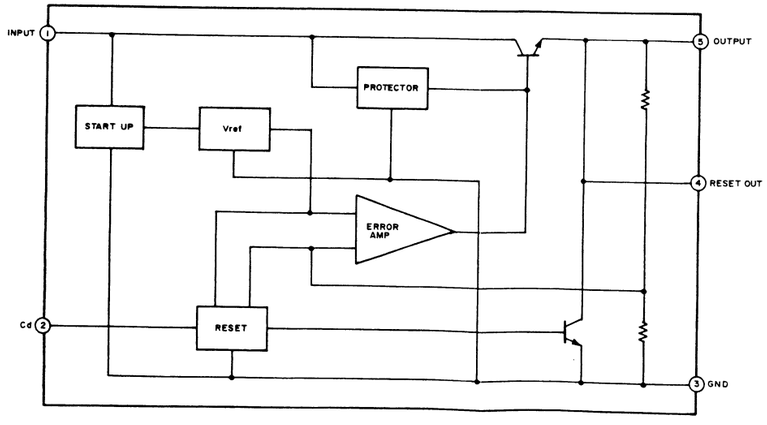
Q601 : HA12155NT



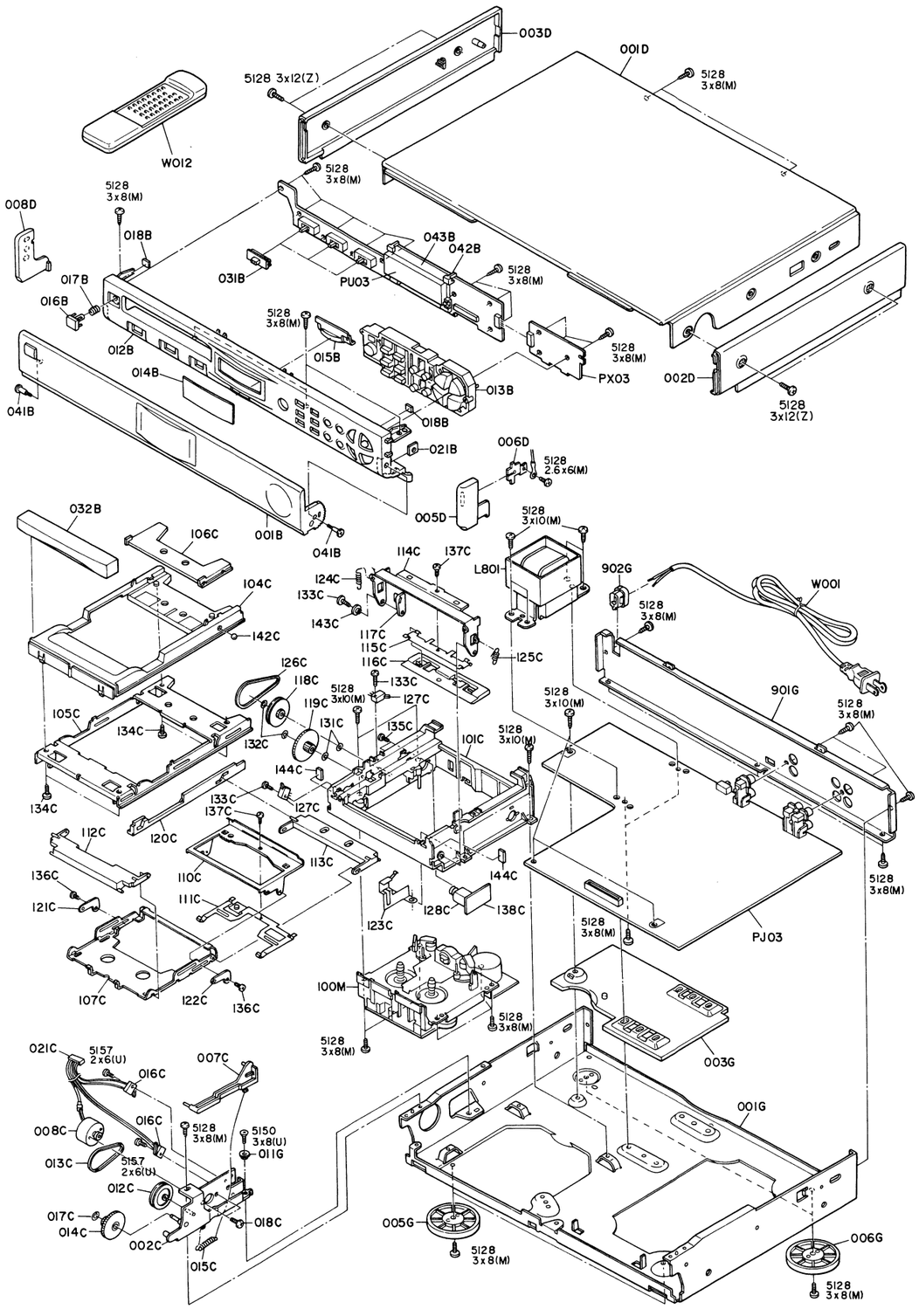
QM31, QM51 : 74HC4094P



Q801 : L78MR05



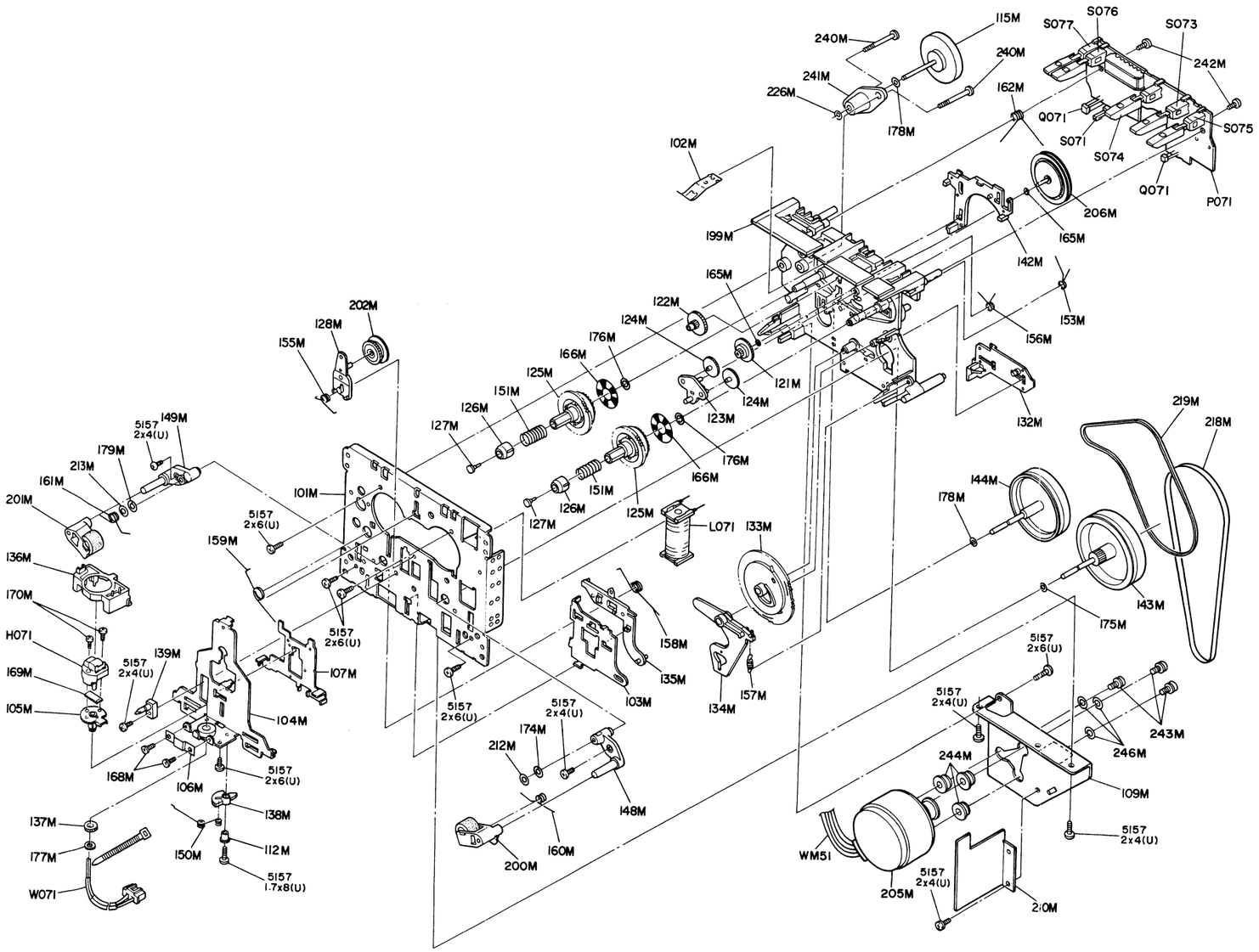
5. EXPLODED VIEW AND PARTS LIST



(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, ••:EUROPE)

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
001B	BLACK	4822 443 10846	DOOR AL PANEL ASSY	477T063510
001B	GRAY	4822 443 64041	DOOR AL PANEL ASSY	446T063500
012B	BLACK	4822 459 04803	FRONT PANEL	446T248310
012B	GRAY	4822 459 04804	FRONT PANEL	446T248210
013B	BLACK	4822 410 62883	BUTTON BLOCK	446T270110
013B	GRAY	4822 410 62941	BUTTON BLOCK	446T270010
014B		4822 450 62123	WINDOW,FL	271K158010
015B		4822 381 11434	LENS,IR	271K355010
016B	BLACK	4822 410 62877	BUTTON,MAINS	157J270130
016B	GRAY	4822 410 62813	BUTTON,MAINS	157J270030
017B		4822 492 33409	SPRING,MAINS BUTTON	271K115010
031B	BLACK	4822 411 61947	KNOB,SLIDE	446T154110
031B	GRAY		KNOB,SLIDE	446T154010
032B	BLACK	4822 466 11737	ESCUTCHEON,TRAY	446T063220
032B	GRAY	4822 454 21102	ESCUTCHEON,TRAY	446T063020
041B		4822 502 21585	SCREW,DOOR SPECIAL	446T010010
042B		4822 256 92093	HOLDER,FL	271K271010
007C		4822 404 21283	LEVER	446T354010
008C		4822 361 21687	D.C MOTOR ASSY	*MM000630R
012C		4822 528 40363	PULLEY	446T262020
013C		4822 358 31264	BELT	446T264010
014C		4822 522 33388	GEAR	446T058010
015C		4822 492 33411	SPRING	446T115010
016C		4822 271 30768	MINI SW.,LEAF	SM01011530
017C		4822 462 71954	STOPPER,WASHER	204K114210
101C		4822 464 50987	FRAME,ASSY	446T401500
104C		4822 443 64033	TRAY	446T163210
107C		4822 256 92106	HOLDER ASSY	446T271500
112C		4822 403 70979	ARM	446T002210
113C			ARM	446T002420
114C		4822 402 10883	ARM	446T002230
116C		4822 401 11505	CLAMPER,PLATE	446T005240
117C		4822 403 70983	ARM	446T002240
118C		4822 528 50363	PULLEY	446T262210
119C		4822 522 33397	GEAR	446T058210
120C		4822 522 33398	GEAR	446T058220
124C		4822 492 71413	SPRING	446T115210
125C		4822 492 71414	SPRING	446T115220
126C		4822 358 31268	BELT	446T264210
127C		4822 277 21716	SLIDE SW.,LEAF	*SS000360R
128C		4822 361 21669	D.C MOTOR ASSY	*MM000610R
132C		4822 462 71954	STOPPER,WASHER	204K114210
133C		4822 502 21449	SCREW	446T010210
134C			SCREW	446T010220
135C		4822 502 21451	SCREW	446T010230
137C		4822 502 21453	SCREW	446T010250
142C		4822 520 40293	BALL	61050010T0
001D	BLACK		LID,TOP COVER	157J257230
001D	GRAY		LID,TOP COVER	157J257030
002D	BLACK	4822 426 10559	SIDE PANEL (R)	281J249010
002D	GRAY	4822 426 30156	SIDE PANEL (R)	157J249010
003D	BLACK	4822 426 10561	SIDE PANEL (L)	281J249020
003D	GRAY	4822 426 30157	SIDE PANEL (L)	157J249020
005D	BLACK	4822 426 10562	BUSHING,SIDE(R)	281J259010
005D	GRAY	4822 532 12253	BUSHING,SIDE(R)	157J259010
006D		4822 281 50181	CONTACTOR,2 TOUCH	294K123010
008D	BLACK	4822 426 10563	BUSHING,SIDE (L)	281J259020
008D	GRAY	4822 532 12254	BUSHING,SIDE (L)	157J259020
005G		4822 462 42068	LEG (HOT STAMP D=50) FRONT	271K057110
006G		4822 462 42069	LEG (HOT STAMP D=37) REAR	271K057120

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
902G	/2A,/2B F,U	4822 532 60948	BUSHING,MAINS CORD	450H259010
902G	K		BUSHING,MAINS CORD	085J259010
			PACKING	
001S	F		PACKING CASE	477T801010
002S	F		CUSHION (L SIDE)	157J809010
003S	F		CUSHION (R SIDE)	157J809020
001T	F		USER GUIDE, SD2020 (F)	477T851110
001T	K,U		USER GUIDE, SD2020 (U,K)	477T851250
001T	/2A,/2B	4822 736 15748	USER GUIDE, SD2020 (N)	477T851310
J011	K		JACK AC ADAPTER	YJ04001240
⚠ W001	F		MAINS CORD	YC02000770
⚠ W001	/2A/,2B K	4822 321 10781	MAINS CORD CW4012 2.5A 250V HD3VVH2F	YC01800340
⚠ W001	U		MAINS CORD UL CSA STP-2	YC01800330
W011			CONNECTIVE CORD RCA ST.1M	ZD01000330
W014			CONNECTIVE CORD RCA PIN	ZD00900100



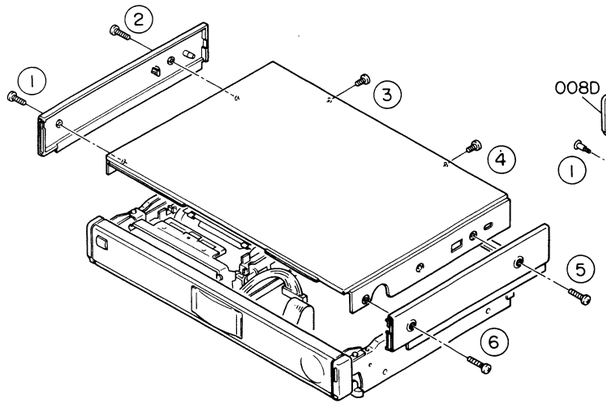
(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, ••:EUROPE)

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
100M			MECHANISM ASSY	446T304500
104M		4822 464 50918	CHASSIS,HEAD ASSY	435T105120
105M		4822 462 10524	STAND,HEAD PLATE ASSY	435T128110
106M		4822 492 71166	LEAF SPRING,AZIMUTH	435T116120
115M		4822 528 90875	IDLER,PULLEY ASSY	446T001110
121M		4822 522 33278	GEAR,CLUTCH	435T058110
122M		4822 522 33279	GEAR,REW	435T058120
123M		4822 403 70682	ARM,FR	435T002110
124M		4822 522 33281	GEAR,FR	435T058130
125M		4822 522 33282	GEAR,REEL	435T058140
126M		4822 462 71856	REEL (A)	435T067110
127M		4822 532 21462	BUSHING,REEL (B)	435T259110
133M		4822 522 33283	GEAR,PLAY CAM	435T058160
136M		4822 528 81477	GUIDE,TAPE	435T051110
137M		4822 522 33284	GEAR,ROTATION	435T058170
138M		4822 522 33285	GEAR,RETURN	435T058180
139M		4822 403 70688	GUIDE,CASSETTE	435T051120
142M		4822 403 10304	ARM,BRAKE	435T002170
143M		4822 528 60414	FLYWHEEL (RDH)	446T273110
144M		4822 528 60415	FLYWHEEL (LDH)	446T273120
150M		4822 492 71149	SPRING,RETURN	435T115110
151M		4822 492 71151	SPRING,REEL	435T115120
153M		4822 492 71153	SPRING,CLUTCH ARM	435T115140
155M		4822 492 71155	SPRING,PLAY ARM	435T115160
156M		4822 492 71156	SPRING,SHIFT LEVER	435T115170
157M		4822 492 71157	SPRING,TRIGGER ARM	435T115180
158M		4822 492 71417	SPRING,SHIFT	446T115120
159M		4822 492 71418	SPRING,HEAD CHASSIS	446T115130
160M		4822 492 71161	SPRING,P ROLLER (R)	435T115210
161M		4822 492 71162	SPRING,P ROLLER (L)	435T115220
162M		4822 492 71163	SPRING,BRAKE ARM	435T115230
165M		4822 532 52473	WASHER,POLYSLIDER	435T012110
166M		4822 466 62425	SEAL,REFLECT	446T108110
168M		4822 502 21222	SCREW,AZIMUTH	435T010110
169M		4822 401 11508	CLAMPER,HEAD WIRE	435T005110
170M		4822 502 21223	SCREW,HEAD (RVS)	435T010120
174M		4822 532 52474	WASHER,POLYSLIDER	435T012120
175M		4822 532 52475	WASHER,POLYSLIDER	435T012130
176M		4822 532 52471	WASHER,TEFRON	427T012110
177M		4822 532 52476	WASHER,POLYSLIDER	435T012140
178M		4822 532 52472	WASHER,POLYSLIDER	427T012120
179M		4822 532 52477	WASHER,POLYSLIDER	435T012150
199M		4822 464 50992	CHASSIS,MECHA BASE ASSY	446T105500
200M		4822 403 70686	ARM,P ROLLER (R) ASSY	435T002500
201M		4822 403 70687	ARM,P ROLLER (L) ASSY	435T002510
202M		4822 522 33286	GEAR,PLAY ASSY	435T058500
205M		4822 361 21671	D.C MOTOR,ASSY	*MM000620R
206M		4822 528 20754	CLUTCH,ASSY	435T061500
208M		4822 532 12262	COLLAR,METAL	435T055120
218M		4822 358 31269	BELT,DRIVE (HA)	446T264110
219M		4822 358 31271	BELT,DRIVE (HB)	446T264120
226M		4822 532 52469	WASHER	426T012120
244M		4822 532 12908	WASHER,MOTOR	446T012110
H071		4822 249 10469	REC./PL-ER HEAD ROTATION	*LH500020R
L071		4822 281 50172	SOLENOID COIL ASSY	*ME100080R
M071		4822 361 30321	D.C MOTOR MOTOR	*MM000190R
Q071		4822 130 82364	PHOTO REFLECTOR	*HW100020R
⚠ S071		4822 271 30781	MINI SW. LEAF RUN	*SM000250R
⚠ S073		4822 271 30779	MINI SW. LEAF TAPE IN	*SM000240R
⚠ S074		4822 271 30779	MINI SW. LEAF METAL	*SM000240R
⚠ S075		4822 271 30779	MINI SW. LEAF R-REC	*SM000240R
⚠ S076		4822 271 30779	MINI SW. LEAF CRO2	*SM000240R
⚠ S077		4822 271 30779	MINI SW. LEAF F-REC	*SM000240R
W071		4822 321 62192	CONNECTIVE CORD 8P HEAD WIRE ASSY	*YB001510R

6. DISASSEMBLY

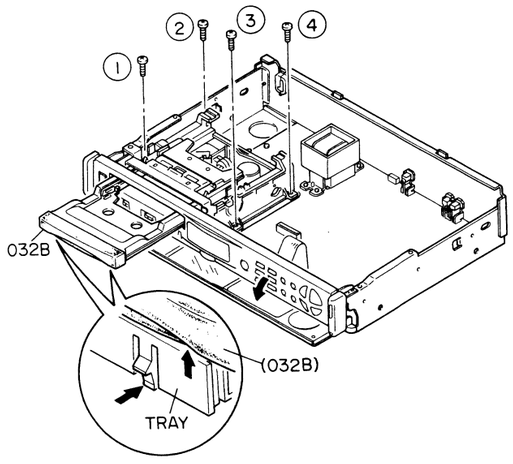
6.1 REMOVING THE TOP COVER AND SIDE PANEL

Remove the screws ① ~ ⑥ .



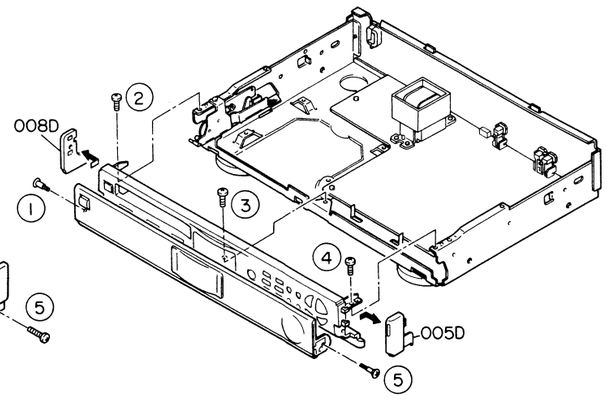
6.2 REMOVING THE MECHANISM

While opening the cassette tray and remove the tray escutcheon (032B) by disengaging two hooks at the bottom side of tray escutcheon.
Close the cassette tray, then remove the screws ① ~ ④ .



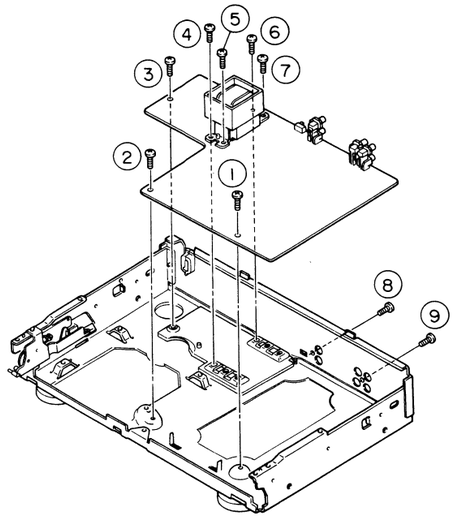
6.3 REMOVING THE FRONT PANEL

Remove the bushings (005D and 008D), then remove the screws ① ~ ⑤ .



6.4 REMOVING THE MAIN P.W. BOARD

Remove the screws ① ~ ⑨ .



7. TEST EQUIPMENT REQUIRED FOR SERVICING

For measuring or checking your Cassette Deck, the following instruments and materials are necessary.

- Audio Oscillator (AF OSC)
- Attenuator (600 Ω)
- VTVM
- Oscilloscope
- Wow and Flutter Meter
- Torque Meter (Cassette Type)
- Digital Frequency Counter
- Blank Tapes (Completely erased with bulk eraser)
  AC-225 (Normal)
  AC-514 (High)
  AC-713 (Metal)

NOTE :
If any doubt is noted in a measured value, use new tape.

- Test Tapes

TCC-112 / MTT-111	Wow and Flutter, Tape Speed
TCC-120 / MTT-212	Signal-to-Noise Ratio
TCC-130 / MTT-150	Dolby Level Adjustment
TCC-161B / MTT-256	Frequency Response (for Normal)
TCC-261B / MTT-356	Frequency Response (for High and Metal)
TCC-192 / MTT-121	Cross Talk
TCC-194 / MTT-141	Channel Separation
TCC-174A / MTT-255M (A-BEX) / (TEAC)	Azimuth adjustment

- Mirror cassette 12 µm padless
  TCC-902 / MTT-902 Tape travel check
- Head and guide gauge (M-300)
  THG-801

8. ELECTRICAL ADJUSTMENTS

(A) Remark for adjustment

1) Test tapes damp easily. Erase magnetism of heads and capstans, etc. completely with head erasers before using them.
2) Keep away from measuring instruments have transformer inside and tape eraser.
3) The method of magnetism erase: turn the head eraser on a little away from the sets. Then, close heads and capstans and move up and down 4-5 times. Turn them off after making distance slowly.
4) Tools you are going to use should not be magnetized. Erase magnetic them by bulkeraser sometimes.
5) Adjust semi-fixed resistor for adjustment and variable coil, etc. spin and the number of times as less as possible.
6) Adjust and check SPEED and WOW, etc. by normal sets condition.
7) A little bond lock and pay attention to sticking around and flowing.
8) Check AC voltage input and audio signal generator output voltage 2-3 times per day to operate as normal.

(B) S.R.L / Standard Recording Level

1. S.R.L (Standard Recording Level) which is 315Hz 250 nWb/m on a tape by*OPEN CIRCUIT MAGNETIC FLUX. The relationship among recording level, meter scale and test tape are as follows:

• OPEN CIRCUIT MAGNETIC FLUX (nWb / m)	160	185	200	220	250	
• OUR STANDARD METER SCALE	-3	-2	-1	0	+1	dB
• CLOSED CIRCUIT MAGNETIC FLUX (nWb / m)	**	160	185	***	****	

(*) : OPEN CIRCUIT MAGNETIC FLUX=CLOSED CIRCUIT MAGNETIC FLUX + LEAK MAGNETIC FLUX.
(**) : S.R.L
(***) : TCC-130 (DOLBY REFERENCE LEVEL) (MTT-150)
(****) : TCC-120 (IEC REFERENCE LEVEL) (MTT-212)

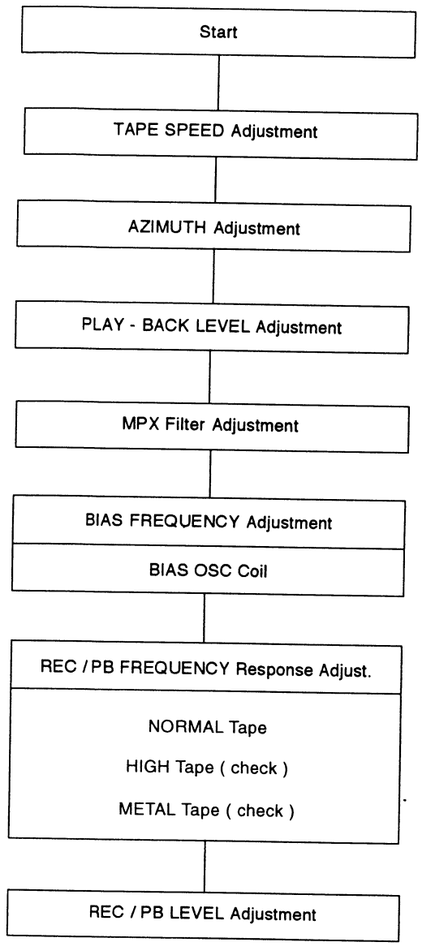
(Note) The display between -1dB to -3dB is not availably in this unit.

2. S.R.L Setting As for sets, DOLBY LEVEL is usually standard, it will be as follows:

1) Recording condition is to add 1 kHz, 100 mV signals on LINE INPUT.
2) Adjust REC VOLUME and should be 300 mV at DOLBY test point J601 / J602.
3) From this condition, input level is -1dB (1dB up by attenuator). It is the standard recording condition at STANDARD RECORDING LEVEL. (S.R.L)

(Note) Depending on measurement items, playing standard level changes a lot. Recording level of specified test tape decides the standard level.

ADJUSTMENT FLOW CHART



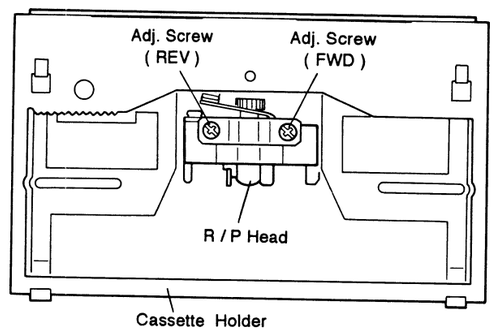
8.1 TAPE SPEED ADJUSTMENT

1) Play the middle of the tape and adjust semi-fixed resistor RM08 to be 3000 Hz (2990 - 3010 Hz).
2) After the set-up, play it again and check within range.

Remarks:
1) Carry them out the set condition.
2) Do not test the mechanism when the condition has a big difference of normal temperature.

8.2 HEAD AZIMUTH ADJUSTMENT AND PLAY-BACK FREQUENCY RESPONSE CHECK

1) Play the frequency response tape and screw the AZIMUTH adjust screw at 12.5 kHz signal. Then, set output maximum to the screwed-up direction.
2) In case L / R peak point is difference, turn the lower channel maximum, keep the L / R balance.
3) Bondlock adjust screw.
4) Next, 315 Hz signal should be 0 dB and read 12.5 kHz signal level. Check the value whether it is normal.
5) Also in REVERSE mode, perform the steps 1 ~ 4.



8.3 PLAY - BACK LEVEL ADJUSTMENT

1) Play the DOLBY test tape, adjust semi-fixed resistors for adjustment RJ23 (L), RJ24 (R) at test points J601 (L), J602 (R). Then, set 300 mV.
2) After adjustment, replay and check it again.

Remark:
In case of drifting replay output, check the tape running and the test tape because it might be defective.

8.4 MPX FILTER ADJUSTMENT

1) Should be recording monitor by DOLBY LEVEL. Input signal level is 0 dB at 1 kHz.
2) Input signal frequency is 19 kHz (within ±10 Hz). Adjust L601 (L), L602 (R) that MPX Filter switch should be "ON" and the level is minimum.

Remark:
It is under -40 dB as usual.

8.5 RECORDING BIAS FREQUENCY AND HX COIL ADJUSTMENT

1) Operate to REC mode at METAL position.
2) High impedance through test point JJ04 and connect to measurement (FREQUENCY COUNTER and OSCILLOSCOPE).
3) Adjust a bias-oscillation coil LL01 to be 105 kHz biasoscillated frequency.
4) Then, adjust HX coil L901 (L) / L902 (R) to maximize the DC voltage at T901 (L) / T902 (R).

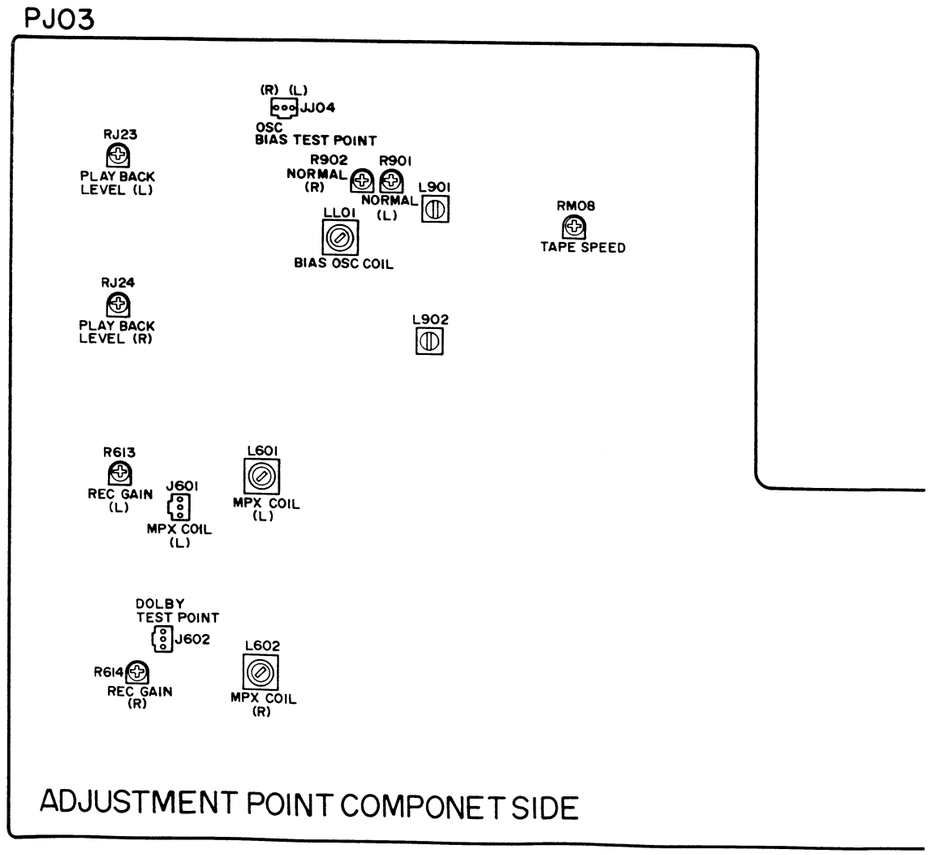
Remark:
It is easy that make a high impedance sensor by 1M ohm resistor.

8.6 REC / PLAY-BACK FREQUENCY RESPONSE ADJUSTMENT

1) Decrease -26dB INPUT LEVEL from S.R.L setting. Record 1kHz and 12.5kHz signals at DOLBY-C position. (NORMAL tape position)
2) REWIND and PLAY it, and read difference level at 1kHz and 12.5kHz.
3) Adjust semi-fixed resistor R901 (L), R902 (R) that the level of differences 1kHz and 12.5kHz should be 0 ~ +1.0dB.
4) Only check HIGH and METAL tape positions.

8.7 REC / PLAY - BACK LEVEL ADJUSTMENT

1) By NORMAL tape position, set S.R.L setting and set monitor level scale 0dB.
2) Do REWIND and PLAY it and adjust semi-fixed resistor R613 (L), R614 (R) to be 1kHz level within ±0.5dB.
3) Only check HIGH and METAL tapes positions.

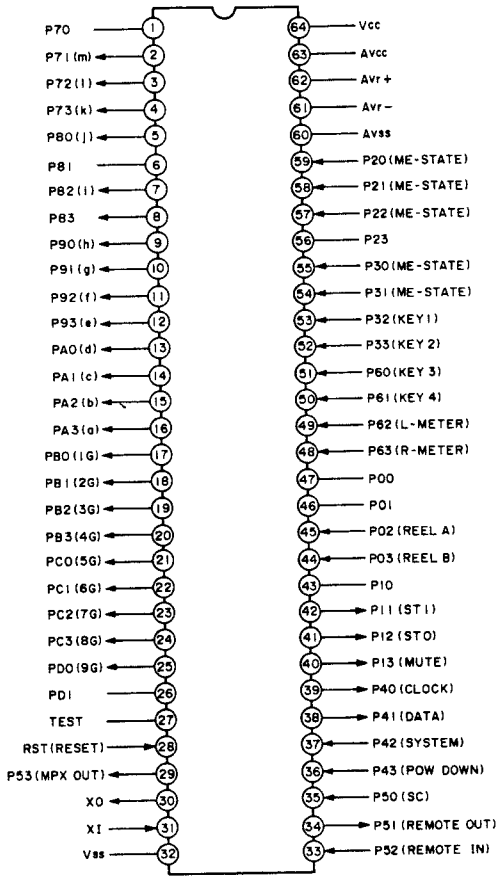


9. SERVICE PROGRAM

1) While pressing REC VOLUME UP and DOWN keys together, connect the power plug to AC outlet.
2) When QMS Key is pressed, all indicators in FL display light up and out. Then, each segment lights up sequentially.
3) Recording starts automatically when REC Key is pressed. When REW Key is pressed, the unit enters in the quick review mode, and play starts from the beginning of the recording.
4) Service program will finish by disconnecting the power plug from AC outlet.

10. MICRO-PROCESSOR DATA

MB88626BP-G-146-SH



Pin Nbr.	Pin Name	I / O	Action	Function
1	P70	-	-	Not Used
2	P71 (m)	O	H	FL Display Anode Drive
3	P72 (l)	O	H	
4	P73 (k)	O	H	
5	P80 (j)	O	H	
6	P81	-	-	Not Used
7	P82 (i)	O	H	FL Display Anode Drive
8	P83	O	H	Clock
9	P90 (h)	O	H	FL Display Anode Drive
10	P91 (g)	O	H	
11	P92 (f)	O	H	
12	P93 (e)	O	H	
13	PA0 (d)	O	H	
14	PA1 (c)	O	H	
15	PA2 (b)	O	H	
16	PA3 (a)	O	H	
17	PB0 (1G)	O	H	FL Display Grid Drive
18	PB1 (2G)	O	H	
19	PB2 (3G)	O	H	
20	PB3 (4G)	O	H	
21	PC0 (5G)	O	H	
22	PC1 (6G)	O	H	
23	PC2 (7G)	O	H	
24	PC3 (8G)	O	H	
25	PD0 (9G)	O	H	
26	PD1	-	-	Not Used
27	TEST	-	-	Not Used
28	RST (RESET)	I	L	μ-Processor Reset
29	P53 (MPX OUT)	O	H	MPX Control Output
30	XO	O	-	OSC
31	XI	I	-	OSC
32	Vss	-	-	GND

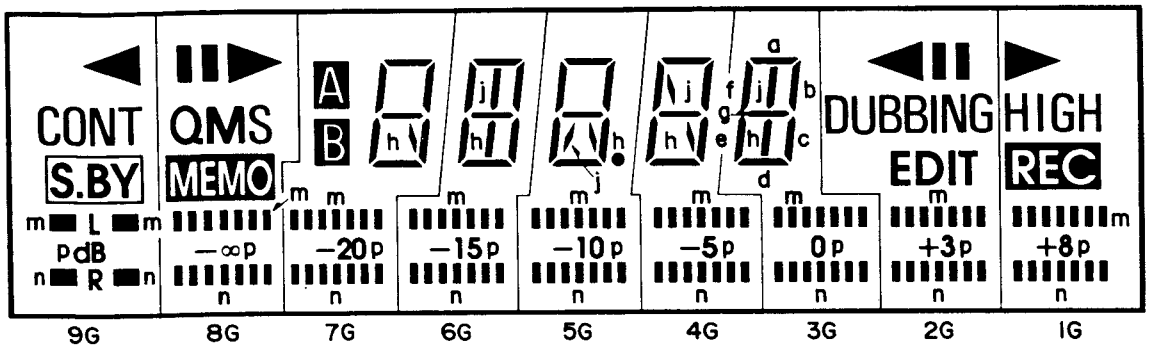
Pin Nbr.	Pin Name	I / O	Action	Function
33	P52 (REMOTE IN)	I	L	Remote Input
34	P51 (REMOTE OUT)	O	L	Remote Output
35	P50 (SC)	I	-	Clock In
36	P43 (POW DOWN)	I	H	Power Off Detector (INT2)
37	P42 (SYSTEM)	I	H	System Select
38	P41 (DATA)	O	H	Dolby, Rec Meter, Volume, Motor, Speed, On/Off, Solenoid
39	P40 (CLOCK)	O	H/L	HA12155, 74HC4094
40	P13 (MUTE)	O	H/L	Rec. Mute
41	P12 (ST 0)	O	H/L	HA12155 (Dolby, Rec-Amp, Meter, Volume) Strobe
42	P11 (ST 1)	O	H/L	Motor, Speed, On/Off, Solenoid
43	P10	-	-	Not Used
44	P03 (REEL B)	I	H/L	Reel
45	P02 (REEL A)	I	H/L	
46	P01	-	-	Not Used
47	P00	-	-	Not Used
48	P63 (R-METER)	I	DC	R-ch. Level Meter DC Input
49	P62 (L-METER)	I	DC	L-ch. Level Meter DC Input
50	P61 (KEY 4)	I	DC	Key Switch
51	P60 (KEY 3)	I	DC	
52	P33 (KEY 2)	I	DC	
53	P32 (KEY 1)	I	DC	
54	P31 (ME-STATE)	I	DC	Mechanism State
55	P30 (ME-STATE)	I	DC	
56	P23	-	-	Not Used
57	P22 (ME-STATE)	I	DC	Mechanism State
58	P21 (ME-STATE)	I	DC	
59	P20 (ME-STATE)	I	DC	
60	Avss	-	-	GND
61	Avr -	-	-	GND
62	Avr +	-	-	+5V
63	Avcc	-	-	+5V
64	Vcc	-	-	+5V

11. FL DISPLAY

11.1 TERMINAL CONNECTION

TERMINAL NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
ELECTRODE	F1	F1	NP	NP	9G	8G	7G	6G	NC	5G	4G	3G	2G	1G	NC	NC	P1	P2	P3	
TERMINAL NO.		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
ELECTRODE		P4	P5	P6	P7	NP	NP	P8	P9	P10	P11	P12	P13	NP	NP	NP	NP	NP	F2	F2

Note F : Filament NP : No Pin
G : Grid NC : No Connection
P : Anode



11.2 INTERNAL CONNECTION

	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1			a	a	a	a	a		
P2			b	b	b	b	b		
P3			c	c	c	c	c		
P4			d	d	d	d	d		
P5		▯▯	e	e	e	e	e	▯▯	
P6	◁	▷	f	f	f	f	f	◁	▷
P7	CONT	QMS	g	g	g	g	g	DUBBING	HIGH
P8	S.BY	MEMO	h	h	h	h	h	EDIT	REC
P9	L		A	j	j	j	j		
P10	R		B		●				
P11	m	m	m	m	m	m	m	m	m
P12	n	n	n	n	n	n	n	n	n
P13	p	p	p	p	p	p	p	p	p

サービス時に必要な試験機材

● このModelを測定又はチェックするのに次のものが必要です。

- オーディオ発振器 (AF OSC)
- アッテネータ (600Ω)
- VTVM
- 歪率計
- オシロスコープ
- ワウ、フラッターメーター
- トルクメーター (カセット型)
- デジタル周波数カウンター
- ブランクテープ
  (バルクイレーサーで完全に消去したもの)
  AC-225 (Nomal) AC-713 (Metal)
  AC-514 (High)

注意：
もし測定値が疑わしい場合は新しいテープを使用してください。

- テストテープ

TCC-112・MTT-111 ..... ワウ・フラッタ
テープスピード
TCC-120・MTT-212 ..... S/N比
TCC-130・MTT-150 ..... 出力レベル測定
TCC-161B・MTT-256 ..... 周波数特性測定 (Normal用)
TCC-261B・MTT-356 ..... 周波数特性測定 (High/Metal用)
TCC-192・MTT-121 ..... クロストーク
TCC-194・MTT-141 ..... チャンネルセパレーション
TCC-174A・MTT-255M ..... アジマス調整
(A-BEX)・(TEAC)

- ヘッドおよびガイドゲージ(M-300)

THG-801 ..... ヘッド、ガイド調整

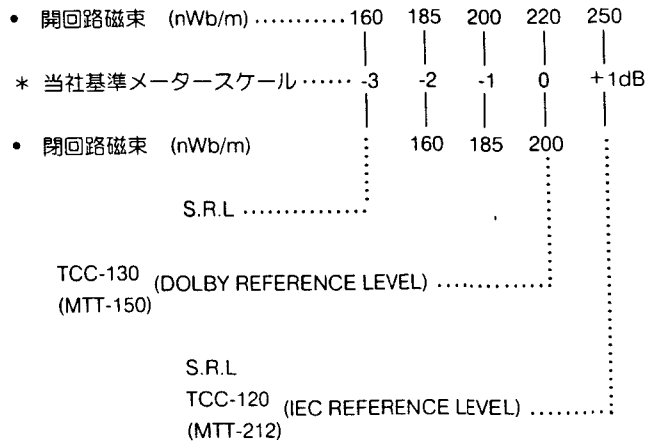
回路の調整と測定

● 調整上の注意点

1) テストテープは減衰しやすいので、使用する前にヘッド、キャプスタン等をイレーサーにて充分に消磁してください。
2) テストテープはトランス内蔵の計測器やイレーサーのすぐ近くには置かないでください。
3) 消磁の方法として、セットからやや離れた所でイレーサーのスイッチを入れヘッド、キャプスタンに近づけ上下に4～5回動かし、ゆっくり離し遠ざけてからスイッチを切ってください。
4) 使用する工具は帯磁していないこと、時々バルクイレーサーで消磁してください。
5) 調整用半固定抵抗及び可変コイル等は、極力最小の回転/回数で調整してください。
6) スピード、ワウ等は、セットの通常の姿勢で調整/チェックしてください。
7) ボンドロックは少量にし、周辺に付着あるいは流れ出ることなど無いよう注意してください。
8) AC電源電圧、低周波発信器出力電圧等は、1日2～3回規定通りかチェックしてください。

S.R.L/Standard Recording Level基準録音レベル

1. テープ上に開回路磁束で、315Hz 250nWb/mの磁束を記録出来るレベルのことであり、記録レベルとメータースケール及びテストテープの関係は以下の通りです。

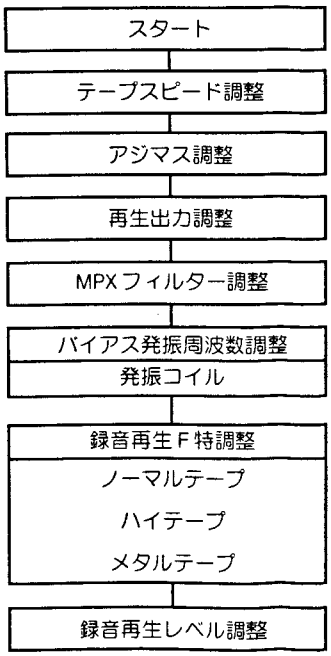


注意：
(1) 開回路磁束 = 閉回路磁束 + 漏洩磁束
(2) 当モデルのFLは、-1から-3の表示がないです。

2. セットでは通常ドルビーレベルを基準としているので、以下のようになります。
   1) LINE入力に1KHz、100mVの信号を加え録音状態とします。
   2) RECボリュームを調整し、ドルビーポイントJ601(L)/J602(R)でのレベルが300mVとなるようにします。
   3) この状態から入力レベルを+1dBとした (アッテネーで1dB上げる) 状態がすなわち、基準録音レベル (S.R.L) での録音状態です。

注意：
再生の基準レベルはその測定項目により異なり、使用指定のテストテープの記録レベルが基準レベルを決定することになります。

調整フローチャート



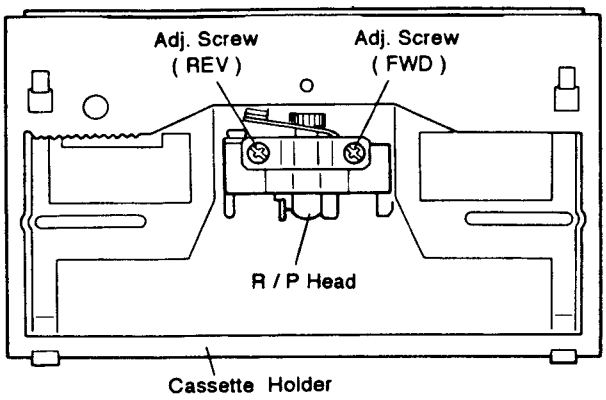
●テープスピード調整

1. テープの中間を再生し、調整半固定抵抗 RM08 を調整して、3000Hz(2990～3010Hz) になるように調整します。
2. 設定後、再度再生して範囲内のことを確認します。

注意：
1. 据置きの姿勢で調整してください。
2. メカニズムが常温と大きく異なる温度状態では、調整しないでください。

●ヘッドアジマス調整/再生F特調整

1) F特テープを再生し、12.5KHzの信号でアジマス調整ビスを回し、締め付け方向で出力最大点に合わせます。
2) L/Rピーク点が違う場合は、低いチャンネルを最大にし、L/Rのバランスを取ります。
3) 調整ビスをボンドロックします。
4) 次に、315Hzの信号を0dBとし、12.5KHzの信号のレベルを読みます。無調整タイプのセットの場合は異常な値でないことを確認します。
5 リバースモードでも同様に各々確認して下さい。



●再生出力調整

1) ドルビーレベルテストテープを再生し、テストポイントJ601(L)/J602(R)で調整用半固定抵抗RJ23(L)/RJ24(R)を調整し、それぞれ出力電圧を300mVに合わせます。
2) 調整後再度再生し、再確認してください。

＊再生出力が変動する場合はテープ走行の不良、又はテストテープの不良が考えられるのでチェックしてください。

●MPXフィルター周波数調整

1) ドルビーレベルで録音モニター状態とし、入力信号周波数が1KHzの時のレベルを0dBとします。
2) 入力信号周波数を19KHz (± 10Hz以内) とし、MPXフィルタースイッチが「ON」の状態でレベルが最小となるよう、L601(L)/L602(R)を調整します。

＊通常は、-40dB以下となります。

●録音バイアス周波数及びHXコイル共振調整

1)「METAL」ポジションで録音状態とします。
2) テストポイントJJ04に10PFのコンデンサを介して測定器に接続します。(周波数カウンター及びオシロスコープ)
3) バイアス発振周波数を105KHzとなるよう発振コイルLL01を調整します。
4) 次に、HXコイルL901(L)/L902(R)を調整しJ901出力の最小点に合わせます。

●録音再生F特調整

1) 基準録音レベルから入力レベルを更に-2dB減じ、1KHzと12.5KHzの信号をDOLBY-Cポジションで録音します。(NORMALテープ)
2) 巻き戻し再生し、1KHzと12.5KHzの信号のレベル差が0～+1.0dBとなるよう、調整用半固定抵抗R901(L)/R902(R)を調整します。
3) HIGH, METALテープでも同様に行い確認します。

●録音再生レベル調整

1) NORMALテープにて動作録音状態とし、モニターレベルを0dBとします。
2) 巻き戻し再生し、1KHzのレベルが± 0.5dB以内となるよう、調整用半固定抵抗R613(L)/R614(R)を調整します。
3) HIGH, METALでは確認のみ行います。

◘ サービスプログラム

▼ DOWNと ▲ UPボタン (REC LEVEL) を押しながらACプラグを差します (POWER ON)。

1) FLセグメントテスト
QMSボタンを押します。FLセグメントが全点灯しその後、セグメントが1つずつ点滅します。
2) RECテスト （ポーズモード省略）
RECボタンを押すと録音スタートし、もう一度RECボタンを押すと録音スタート地点に戻り、再生されます。

プログラム終了はACプラグを抜きます。

12. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTORS

R＊＊＊ : 1) GD05 x x x 140, Carbon film fixed resistor, ±5% 1/4W
R＊＊＊ : 2) GD05 x x x 160, Carbon film fixed resistor, ±5% 1/6W
① Resistance value

Examples
① Resistance value

0.1 Ω 001	10 Ω 100	1k Ω.. 102	100k Ω 104
0.5 Ω 005	18 Ω 180	2.7k Ω.. 272	680k Ω 684
1 Ω 010	100 Ω 101	10k Ω.. 103	1M Ω 105
6.8 Ω 068	390 Ω 391	22k Ω.. 223	4.7M Ω 475

Note : Please distinguish 1/4W from 1/6W by the shape of parts used actually.

CAPACITORS

C＊＊＊ : CERAMIC CAP.
3) DD1 x x x x 370, Ceramic capacitor
Disc type
Temp.coeff. P350~N1000, 50V
③ Capacity value
② Tolerance

Examples
② Tolerance (Capacity deviation)
± 0.25 pF 0
± 0.5 pF 1
± 5 % 5
＊ Tolerance of COMMON PARTS handled here are as follows :
0.5 pF - 5 pF ..... ± 0.25 pF
6 pF - 10 pF ..... ± 0.5 pF
12 pF - 560 pF ... ± 5 %
③ Capacity value

0.5 pF 005	3 pF 030	100 pF 101
1 pF 010	10 pF 100	220 pF 221
1.5 pF 015	47 pF 470	560 pF 561

C＊＊＊ : CERAMIC CAP.
4) DK16 x x x 300, High dielectric constant ceramic capacitor
Disc type
Temp.chara. 2B4, 50V
④ Capacity value

Examples
④ Capacity value

100 pF 101	1000 pF 102	10000 pF 103
470 pF 471	2200 pF 222	

C＊＊＊ : 5) ELECTROLY CAP.(⏚), 6)FILM CAP (⏤)
5) EA x x x x x x 10, Electrolytic capacitor
One-way lead type,Tolerance ±20%
⑥ Working voltage
⑤ Capacity value

Examples
⑤ Capacity value

0.1μ F 104	4.7μ F 475	100μ F 107
0.33μ F 334	10μ F 106	330μ F 337
1μ F 105	22μ F 226	1100μ F 118
		2200μ F 228

⑥ Working voltage

6.3 V. . .006	25 V. . .025
10 V. . .010	35 V. . .035
16 V. . .016	50 V. . .050

6) DF15 x x x 350 → Plastic film capacitor
DF15 x x x 310 → One-way type, Mylar ±5% 50V
DF16 x x x 310 → Plastic film capacitor
One-way type, Mylar ±10% 50V
⑦ Capacity value

Examples
⑦ Capacity value

0.001μF (1000pF) 102	0.1μF 104
0.0018μF 182	0.56μF 564
0.01μF 103	1μF 105
0.015μF 153	

NOTE :1) The above CODES(R＊＊＊,R＊＊＊,C＊＊＊,C＊＊＊ and C＊＊＊) are omitted on the schematic diagram in some case.
2) On the occasion, be confirmed the common parts on the parts list.
3) Refer to "Common Parts List" for the other common parts(**RI05, DD4, DK4**).

NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows ;

1 . KOA Corporation

Part No.(MJI)	Type No.(KOA)	Description
NH05 x x x 140	RF25S x x x x Ω J	(±5% 1/4W)
NH05 x x x 120	RF50S x x x x Ω J	(±5% 1/2W)
NH85 x x x 110	RF73B2A x x x x Ω J	(±5% 1/10W)
NH95 x x x 140	RF73B2E x x x x Ω J	(±5% 1/4W)

＊ Resistance value　　Resistance value(0.1 Ω- 10k Ω)

2. Matsushita Electronic Components Co., Ltd

Part No.(MJI)	Type No.(MEC)	Description
NF05 x x x 140	ERD-2FCJ x x x	(±5% 1/4W)
RF05 x x x 140		
NF02 x x x 140	ERD-2FCG x x x	(±2% 1/4W)
RF02 x x x 140		

＊ Resistance value

Examples
＊ Resistance value

0.1 Ω 001	10 Ω 100	1k Ω .. 102	100k Ω 104
0.5 Ω 005	18 Ω 180	2.7k Ω .. 272	680k Ω 684
1 Ω 010	100 Ω 101	10k Ω .. 103	1M Ω 105
6.8 Ω 068	390 Ω 391	22k Ω .. 223	4.7M Ω 475

ABBREVIATION AND MARKS			
ANT.	: ANTENNA	BATT.	: BATTERY
CAP.	: CAPACITOR	CER.	: CERAMIC
CONN.	: CONNECTING	DIG.	: DIGITAL
HP	: HEADPHONE	MIC.	: MICROPHONE
μ -PRO	: MICROPROCESSOR	REC.	: RECORDING
RES.	: RESISTOR	SPK	: SPEAKER
SW	: SWITCH	TRANSF.	: TRANSFORMER
TRIM.	: TRIMMING	TRS.	: TRANSISTOR
VAR.	: VARIABLE	X ' TAL	: CRYSTAL

NOTE ON SAFETY:

Symbol ⚠ Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol ⚠ Any other component substituton (other than original type), may increase risk of fire or electrical shock hazard.

安全上の注意：
⚠ がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

(VERS. :VERSION, U:U.S.A., F:JAPAN, K:FAR EAST, ••:EUROPE)

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			PJ03-AUDIO/POWER/LOGIC MAIN CIRCUIT BOARD	
			PJ03-CAPACITORS	
CF01		4822 124 41539	ELECT 47µF ±20% 16V RA-2	OA47601620
CF02		4822 126 10408	CER. 220pF ±10%	DA16221110
CF03		4822 124 22274	ELECT 4.7µF ±20% 50V	OA47505020
CF04		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
CF05		4822 122 33639	CER. 1000pF ±10% 25V	DA16102110
CF06		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
CJ01		4822 126 11127	CER. 470pF ±10% 50V	DA16471110
CJ02		4822 126 11127	CER. 470pF ±10% 50V	DA16471110
CJ11		4822 124 90354	ELECT 100µF ±20% 16V	OA10701620
CJ12		4822 124 90354	ELECT 100µF ±20% 16V	OA10701620
CJ15		4822 124 22274	ELECT 47µF ±20% 50V	OA47505020
CJ16		4822 124 22274	ELECT 47µF ±20% 50V	OA47505020
CJ18		4822 124 90364	ELECT 220µF ±20% 16V	OA22701620
CJ19		4822 124 90354	ELECT 100µF ±20% 16V	OA10701620
CJ20		4822 124 90352	ELECT 10µF ±20% 16V	OA10601620
CJ21		4822 122 40588	CER. 0.022µF +80%-20% 50V	DA17223110
CJ22		4822 122 40588	CER. 0.022µF +80%-20% 50V	DA17223110
CK01		4822 124 22274	ELECT 4.7µF ±20% 50V	OA47505020
CK02		4822 124 22274	ELECT 4.7µF ±20% 50V	OA47505020
CK03		4822 122 31211	CER. 100pF ±10% 500V	DK16101550
CK04		4822 122 31211	CER. 100pF ±10% 500V	DK16101550
CK07		4822 122 33639	CER. 1000pF ±10%	DA16102110
CK08		4822 122 33639	CER. 1000pF ±10%	DA16102110
CL03		4822 124 41539	ELECT 47µF ±20% 16V	OA47601620
CL04		4822 121 43774	FILM 0.012µF ±10% 200V	DF76123530
CL31		4822 124 22274	ELECT 4.7µF ±20% 50V	OA47505020
CL32		4822 124 90364	ELECT 220µF ±20% 16V	OA22701620
CM32		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CM33		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CM34		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
CM51		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CM52		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CR03		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
CU06		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CU07		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CU08		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
CU11		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
CW01		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW02		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW03		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
CW04		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
CW11		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
CW13		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW14		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW15		4822 126 11127	CER. 470pF ±10% 50V	DA16471110
CW16		4822 126 11127	CER. 470pF ±10% 50V	DA16471110
CW17		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW18		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
CW21		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
C601		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C602		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020

POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
C607		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
C608		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
C609		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
C623		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
C624		4822 124 90357	ELECT 2.2µF ±20% 50V	OA22505020
C625		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C626		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C629		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C630		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C635		4822 124 90364	ELECT 220µF ±20% 16V	OA22701620
C636		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
C637		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C638		4822 124 22273	ELECT 0.47µF ±20% 50V	OA47405020
C639		4822 122 33639	CER. 1000pF ±10% 25V	DA16102110
C640		4822 126 10362	CER. 22pF ±50%	DA15220110
C641		4822 126 10362	CER. 22pF ±50%	DA15220110
C642		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
C643		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
C644		4822 122 40617	CER. 0.1µF +80%-20% 50V	DD38104010
C801 ∫ C804		4822 122 30103	CER. 0.022µF +80%-20% 50V	DK18223310
C806		4822 124 90388	ELECT 3300µF ±20% 16V	OA33801620
C807		4822 124 90364	ELECT 220µF ±20% 16V	OA22701620
C808		4822 124 22703	ELECT 0.22µF ±20% 50V	OA22405020
C809		4822 124 90354	ELECT 100µF ±20% 16V	OA10701620
C810		4822 124 22695	ELECT 2200µF ±20% 35V	OA22803520
C811		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
C812		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
C813		4822 124 41538	ELECT 220µF ±20% 35V	OA22703520
C814		4822 124 90354	ELECT 100µF ±20% 16V	OA10701620
C816		4822 124 41543	ELECT 1µF ±20% 50V	OA10505020
C817		4822 124 22274	ELECT 4.7µF ±20% 50V	OA47505020
C818		4822 122 40588	CER. 0.022µF ±20% 25V	DA17223110
C819		4822 122 30103	CER. 0.022µF ±20% 50V	DK18223310
C820		4822 124 90364	ELECT 220µF ±20% 16V	OA22701620
C901		4822 126 10409	CER. 560pF ±10% 25V	DA16561110
C902		4822 126 10409	CER. 560pF ±10% 25V	DA16561110
C909		4822 122 31211	CER. 100pF ±10% 500V	DK16101550
C910		4822 122 31211	CER. 100pF ±10% 500V	DK16101550
C911		4822 122 40588	CER. 0.022µF ±20% 50V	DA17223110
C912		4822 122 40588	CER. 0.022µF ±20% 50V	DA17223110
C913		4822 121 43775	FILM 560pF ±10% 250V	DF76561530
C914		4822 121 43775	FILM 560pF ±10% 250V	DF76561530
C931		4822 122 40588	CER. 0.022µF ±20% 50V	DA17223110
C932		4822 122 40588	CER. 0.022µF ±20% 50V	DA17223110
C933		4822 124 41539	ELECT 47µF ±20% 16V	OA47601620
C934		4822 126 10362	CER. 22pF ±50% 50V	DA15220110
C941		4822 122 40588	CER. 0.022µF ±20% 50V	DA17223110
			PJ03-CAPACITORS (COMMON)	
C***			ELECTROLY CAPACITOR ±20% : C805	
C***			PLASTIC FILM CAPACITOR ±5% 50V : CJ13 CJ14 CL01 CL02 C613-C622 C627 C628 C633 C634 C903-C908	

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
			PJ03-RESISTORS	
GU05		4822 111 92166	COMPO. RADAER R2R/110K	BW05114010
GU06		4822 111 92166	COMPO. RADAER R2R/110K	BW05114010
GU07		4822 111 92166	COMPO. RADAER R2R/110K	BW05114010
▲ RF10		4822 050 24701	470Ω ±5% 1/4W	GG05471140
RJ23		4822 100 11351	TRIMMING 10kΩ	RA01030780
RJ24		4822 100 11351	TRIMMING 10kΩ	RA01030780
▲ RJ38		4822 115 90166	FUSE 10Ω ±2% 1/4W	NF02100140
RK46		4822 116 82763	61.9kΩ ±1% 1/6W	GM11661920
▲ RL02		4822 111 90967	FUSE 4.7Ω ±2% 1/4W	NF05047140
▲ RL32		4822 115 90166	FUSE 10Ω ±2% 1/4W	NF02100140
RM08		4822 100 11386	TRIMMING 1kΩ	RA01020780
R613		4822 100 11351	TRIMMING 10kΩ	RA01030780
R614		4822 100 11351	TRIMMING 10kΩ	RA01030780
▲ R631		4822 115 90166	FUSE 10Ω ±2% 1/4W	NF02100140
▲ R801		4822 116 60309	FUSIBLE2.2Ω ±5% 1/4W	NH05022140
▲ R802		4822 116 60307	FUSIBLE1Ω ±5% 1/4W	NH05010140
▲ R803		4822 115 90166	FUSE 10Ω ±2% 1/4W	NF02100140
▲ R805		4822 050 24701	470Ω ±5% 1/4W	GG05471140
▲ R806		4822 050 24701	470Ω ±5% 1/4W	GG05471140
▲ R817		4822 115 90166	FUSE 10Ω ±2% 1/4W	NF02100140
R901		4822 100 11352	TRIMMING 22kΩ	RA02230780
R902		4822 100 11352	TRIMMING 22kΩ	RA02230780
			PJ03-RESISTORS(COMMON)	
R****			CARBON FILM FIXED RES. ±5% 1/6W : RF01-RF08 RJ01 RJ02 RJ05-RJ16 RJ21 RJ22 RJ31 RJ32 RJ34 RJ40 RK09-RK12 RK15 RK39-RK43 RK44 RK45 RK47-RK49 RK51-RK56 RK58 RL01 RL30-RL35 RM04 RM31-RM33 RM41 RM42 RM45-RM52 RR03 RR04 RS03RS24 RU51-RU62 RW01-RW08 RW12-RW22 RW25 U021 U114 U115 R071 R601-R612 R615-R619 R621-R627 R632-R639 R804 R807-R810 R812 R813 R815 R816 R819 R820 R903-R906 R911 R943 R944	
			PJ03-SEMICONDUCTORS	
DF01		4822 130 80837	DIODE HSS81TD 150V 150MA	HD20027010
DF02		4822 130 80837	DIODE HSS81TD 150V 151MA	HD20027010
DF03		4822 130 80326	L.E.D. LT3D8B RED 3O	HI10062320
DF04 ∫ DF07		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
DM31		4822 130 32508	DIODE RL103E DSF10C	HD20003000
DM32		4822 130 80318	ZENER DIODE RD6.8ESB2 MTZJ6.8C	HD30681000
DM51		4822 130 82609	ZENER DIODE MTZJ2.0B	HD30201000
DR01 ∫ DR06		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000

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DS01		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
DS02		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
DS20		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
▲ D801 ∫ ▲ D813		4822 130 32508	DIODE RL103E DSF10C	HD20003000
D814		4822 130 80272	ZENER DIODE RD7.5JB2 MTZJ7.5C	HD30751000
D815		4822 130 80322	ZENER DIODE RD15JB3 MTZJ16A	HD31501000
▲ D816		4822 130 32508	DIODE RL103E DSF10C	HD20003000
▲ D817		4822 130 32508	DIODE RL103E DSF10C	HD20003000
▲ D818		4822 130 32508	DIODE RL103E DSF10C	HD20003000
D820		4822 130 80091	ZENER DIODE RD12JB2 MTZJ12C	HD31201000
QF01		4822 209 63468	IC NJM082D	HC10066090
QF02		4822 130 61189	DIG.TRS.DTC114TS	BA20017210
QJ01		4822 209 62249	IC CXA1115BP PB-EQ AMP	HC10022250
QJ02		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QJ03		4822 209 61667	IC μPC1330HA HEAD SW.	HC10206060
QK01		4822 130 61723	DIG.TRS. DTC323TS	BA20028210
QK02		4822 130 61723	DIG.TRS. DTC323TS	BA20028210
QK15		4822 130 61189	DIG.TRS. DTC114TS	BA20017210
QL01		4822 130 61886	TRS. 2SD1292 Q R	HT412922A0
QL31		4822 130 61725	TRS. 2SD2010	HT42010000
QL32		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
QL33		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QL34		4822 130 60588	DIG.TRS. DTC114ES UN4212	BA20001000
QM31		5322 209 11532	IC 74HC4094P SHIFT REGISTER	HC709449B0
QM33		4822 130 61227	DIG.TRS. DTA114ES UN4111	BA10001000
QM34		4822 130 61886	TRS. 2SD1292S Q OR R	HT412922A0
QM35		4822 130 61725	TRS. 2SD2010	HT42010000
QM36		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QM37		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QM38		4822 130 41947	TRS. 2SC536SP 2SC4588 2SC3311 2SC1740P	HT30001000
QM39		4822 130 41947	TRS. 2SC536SP 2SC4588 2SC3311 2SC1740P	HT30001000
QM40		4822 209 30193	IC LB1641 MOTOR DRIVER	HC10279030
QM41		4822 130 61189	DIG.TRS. DTC114TS	BA20017210
QM51		5322 209 11532	IC 74HC4094P SHIFT REGISTER	HC709449B0
QM52		4822 209 30193	IC LB1641 MOTOR DRIVER	HC10279030
QR04 ∫ QR08		4822 130 61227	DIG.TRS. DTA114ES UN4111	BA10001000
QR09		4822 130 61189	DIG.TRS. DTC114TS	BA20017210
QR10		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QS23		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QS24		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000

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POS. NO	VERS. COLOR	PART NO. (FOR PCS)	DESCRIPTION	PART NO. (MJI)
QW01		4822 209 73275	IC TC9214P SW.	HC10209050
QW02		4822 209 73275	IC TC9214P SW.	HC10209050
QW03		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
QW04		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
QW05		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QW06		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
QW09		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
QW10		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
Q601		4822 209 32748	IC HA12155NH DOLBY B C REC	HC10101010
Q602		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
Q603		4822 130 60588	DIG.TRS. DTC114ES UN4211	BA20001000
Q604		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
Q605		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
Q606		4822 130 61723	DIG.TRS. DTC323TS 2.2K	BA20028210
⚠ Q801		4822 209 70385	IC L78MR05 5V 0.5A REGURATOR	HC10205030
⚠ Q802		4822 209 31629	IC NJM7815FA 0.5A 15V	HC38515090
Q803		4822 130 61227	DIG.TRS. DTA114ES UN4111	BA10001000
Q805		4822 130 42715	TRS. 2SA608SP 2SA1048 2SA1309 2SA933S	HT10001000
Q901		4822 209 72874	IC μPD1297CA HX-PRO	HC10200060
			PJ03-MISCELLANEOUS	
JR03		4822 267 41009	TERMINAL 2P RCA PIN ORNG	YT02020890
JW01		4822 267 31823	TERMINAL 4P RCA PIN RED WHT	YT02040940
LK01		4822 157 53521	CHOKE COIL 22mH J	LC22260710
LK02		4822 157 53521	CHOKE COIL 22mH J	LC22260710
LL01		4822 148 81358	OSC TRANSF. 105K	TC10140410
LL31		4822 152 20622	CHOCK COIL 2.2mH	LC22250610
L601		4822 157 52461	M.P.X. COIL	LS10440060
L602		4822 157 52461	M.P.X. COIL	LS10440060
⚠ L801	F,U		MAINS TRANSF. 100V 120V	TS15426010
⚠ L801	K	4822 146 21748	MAINS TRANSF. 115V 230V	TS15426030
⚠ L801	/2A/2B	4822 146 21747	MAINS TRANSF. 230V 240V	TS15426020
L901		4822 157 63829	HX-PRO COIL 105kHz	TC10110030
L902		4822 157 63829	HX-PRO COIL 105kHz	TC10110030
SR01		4822 277 21717	SLIDE SW. EXT SYSTEM	SS02021480
⚠ S091	K	4822 277 21825	SLIDE SW. SDKGA4	SS02021510
			PU03-μ-COM / FL / KEY CIRCUIT BOARD	
			PU03-CAPACITORS	
CU01		4822 124 21894	ELECT 10μF 16V	EJ10601610
CU02			BIG ELECT 0.047F 5.5V	EX47300540
CU03		4822 122 40588	CER. 0.022μF ±20% 25V	DA17223110
CU10		4822 126 10362	CER. 22pF ±5% 25V	DA15220110
CU12		4822 122 40588	CER. 0.022μF ±20% 50V	DA17223110
			PU03-RESISTORS	
GU02		4822 111 92166	COMPO. RADAER R2R 110K	BW05114010
GU08		4822 111 91397	COMPO. 100kΩ x 13	BW05104060
GU09		4822 111 91644	COMPO. 100kΩ x 9	BW05104120

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			PU03-RESISTORS(COMMON)	
R***			CARBON FILM FIXED RES. ±5% 1/6W : RU01-RU05 RU10-RU13 RY09-RY32 RY52-RY54	
			PU03-SEMICONDUCTORS	
DU01		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
DU02		4822 130 32362	DIODE 1SS176 MA165 1SS254 30V 0.1A	HD20002000
QU01		4822 209 32749	MICROPROCESSR MB88626B 16K	HU10022180
			PU03-MISCELLANEOUS	
JU01		4822 267 60416	JACK SLW28R-1C7 28P	YJ06020580
SS01		4822 277 30867	SLIDE SW. REVERSE-MODE	SS02030370
SS02		4822 277 30867	SLIDE SW. TIMER REC PLAY	SS02030370
SS03		4822 277 30867	SLIDE SW. DOLBY OFF B C	SS02030370
SY08		4822 276 20508	PUSH SW. TACT	SP01011280
SY10		4822 276 20508	PUSH SW. TACT	SP01011280
SY16		4822 276 20508	PUSH SW. TACT	SP01011280
SY20		4822 276 20508	PUSH SW. TACT	SP01011280
SY27		4822 276 20508	PUSH SW. TACT	SP01011280
SY28		4822 276 20508	PUSH SW. TACT	SP01011280
SY29		4822 276 20508	PUSH SW. TACT	SP01011280
SY31		4822 276 20508	PUSH SW. TACT G760ALPS	SP01011280
VU01		4822 130 91285	DISPLAY UNIT FIP9DAM7	HQ30914060
XU01		4822 242 72066	CERAMIC RESONATOR CST8.00MGW	FQ08004010
			PX03-KEY CIRCUIT BOARD	
			PX03-CAPACITOR	
CU04		4822 122 40588	CER. 0.022μF ±20% 25V	DA17223110
			PX03-RESISTOR	
GU01		4822 111 92166	COMPO. RADAER R2R/110K	BW05114010
			PX03-RESISTORS(COMMON)	
R***			CARBON FILM FIXED RES. ±5% 1/6W : RU14-RU17 RY01-RY07 RY51	
			PX03-MISCELLANEOUS	
SY01 ∫ SY07		4822 276 20508	PUSH SW. TACT	SP01011280
SY14		4822 276 20508	PUSH SW. TACT	SP01011280